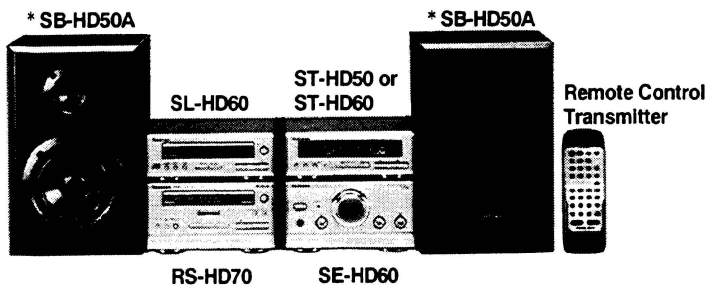
ORDER NO. AD9702015C2

Service Manual

Tuner

Tuner

System: SC-HD50



ST-HD50

Colour
(N) ..... Gold

Area
(E) ..... Europe.

*

System	Areas	Tuner
SC-HD50	(Germany. Italy.) :	ST-HD60
SC-HD50	(Europe. Russia.) :	ST-HD50

Because of unique interconnecting cables, when a compact requires service, send or bring in the entire system.

Specifications

Pre-amplifier Section

Input sensitivity/impedance
EXTERNAL: 250 mV/15 kohm
Output level
EXTERNAL: 250 mV/1.5 kohm
Frequency response
EXTERNAL: 50 Hz – 25 kHz
S/N
EXTERNAL: DIN 82 dB (83 dB, IHF)

FM tuner Section

Frequency range: 87.50 – 108.00 MHz (0.05 MHz steps)
Sensitivity: 1.8 μV (IHF usable)
S/N 26 dB: 1.5 μV
S/N
MONO: 70dB (75 dB, IHF)
Stereo separation
1 kHz: 35 dB
Antenna terminal(s): 75 ohm (unbalanced)

AM tuner Section

Frequency range: 522 – 1611 kHz (9 kHz steps)
530 – 1620 kHz (10 kHz steps)
Sensitivity (S/N 20 dB): 500 μV/m
MAIN: 80 dB

Timer Section

Clock: Quartz-lock type
Function: 24-hour programmable;
Play timer (1 time), Rec timer (1 time)
Sleep (120 min., 30 min., intervals)
Setting: 1 minute – 23 hours 59 minutes (1 min. intervals)

General

Dimensions: 196(W)/67(H)/235(D) mm
Weight: 1.2 kg

Notes:
Specifications are subject to change without notice.
Weight and dimensions are approximate.

System/SC-HD50:
Tuner: ST-HD50 or ST-HD60, Compact Disc Player: SL-HD60, Amplifier: SE-HD50, Cassette Deck: RS-HD70, Speakers: SB-HD50A

Notes: * ..... Made in PAES

⚠WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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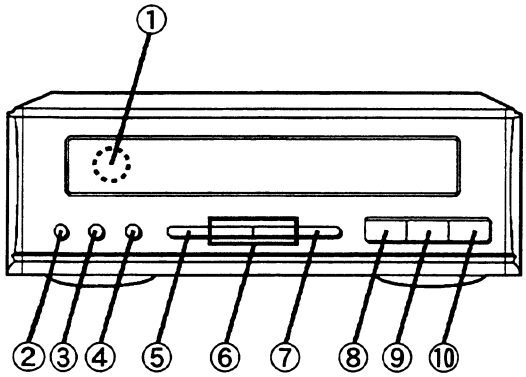
NOTE:
Refer to the service manual for Model No. SE-HD50 (ORDER No. AD9702022C3) for information on "Accessories", "Installation", "Connections" and "Packaging".

■ Location of Controls



① Remote control signal sensor (SENSOR)
② Record timer button (◴ REC)
③ Play timer button (◴ PLAY)
④ Clock/timer buttons (CLOCK/TIMER)
⑤ Set button (SET)
⑥ Tuning/time adjust button (∨ , ∧ TUNING/TIME ADJUST)
⑦ Tuning mode select button (TUNING MODE)
⑧ Source input select button (INPUT SELECTOR)
⑨ RDS display mode select button (RDS DISPLAY MODE)
⑩ Band select button (FM/AM)

■ Setting the Time

The tuner display the time, frequency and other information on CDs and tapes.

This is a 24-hour display clock.

These instructions explain how to set the timer for 16:25 on Wednesday.

1 Switch on the power.

2 ① Press CLOCK/TIMER to show "CLOCK".

Every time you press the button, the indication changes in the order of CLOCK → ◴ REC → ◴ PLAY → Original display.

Within 8 seconds:

② Press SET.

3 ① Press ∨ or ∧ to select the day.

Every time you press one of the button, the indication changes in the order of SUN ⇄ MON ⇄ TUE ⇄ WED ⇄ THU ⇄ FRI ⇄ SAT.

② Press SET.

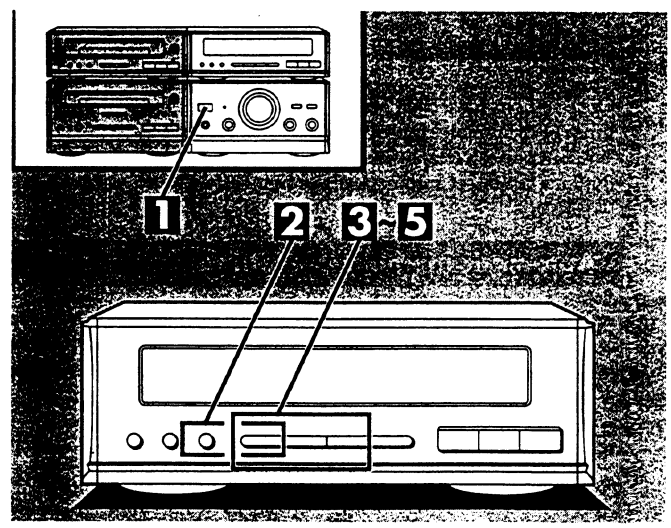
4 ① Press ∨ or ∧ to select the hour.

② Press SET.

5 ① Press ∨ or ∧ to select the minutes.

② Press SET to finish setting the time.

The display will return to the previous display after about 3 seconds.



When " - - : - - " appears:
If flashes when you connect the AC power supply cord for the first time or if there has been a power failure.
Reset the time as explained above.

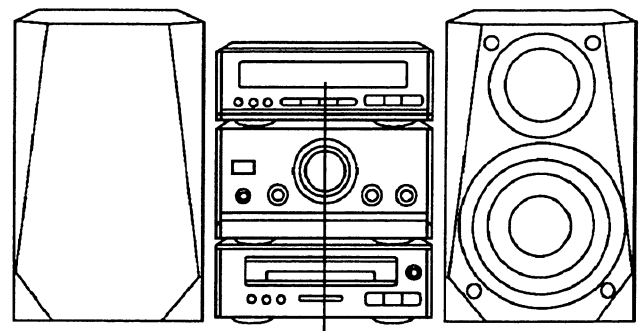
If the minutes setting is off:
1. Press CLOCK/TIMER.
2. Press SET 3 times.
3. Press ∨ or ∧ to set the minutes, and then press SET.

To display the clock again:
Press CLOCK/TIMER.
The clock display will appear for about 8 seconds.

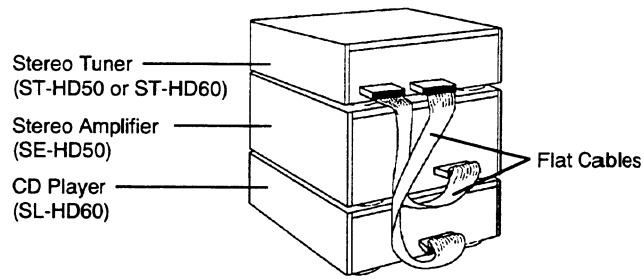
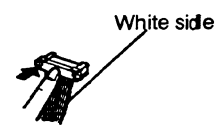
For your reference:
When you turn OFF the system from the POWER button, the system goes on standby and the STANDBY indicator lights up.

■About the Self-Diagnostic Mode

This unit is equipped with a self-diagnostic function which, in the event of a malfunction, automatically displays a code indicating the nature of the malfunction. Use this self-diagnostic function when servicing the unit.

Display method	Display location
To display the malfunction code U70 CD ..... Automatically displays on the stereo tuner processor when a malfunction occurs. ＊Good-bye＊ ..... Automatically displays on the stereo tuner processor when a malfunction occurs. **To return to the normal display** **1. For U70 CD:** ● Press an any operation button on the stereo tuner. ● To re-display the code, switch the power off (POWER STANDBY button), and then switch power back on again. **2. For ＊Good-bye＊:** ● If "＊Good-bye＊" is displayed, the power will automatically be switched off and the standby indicator will light up. ● "＊Good-bye＊" will be displayed for 3 seconds, and then the clock will be displayed. ● To re-display the code, switch the power on. "＊Good-bye＊" will be re-displayed, and then after 3 seconds the clock will be displayed and the power will automatically switch off.	 ***U70 CD*** ***＊Good-bye＊***

Display contents

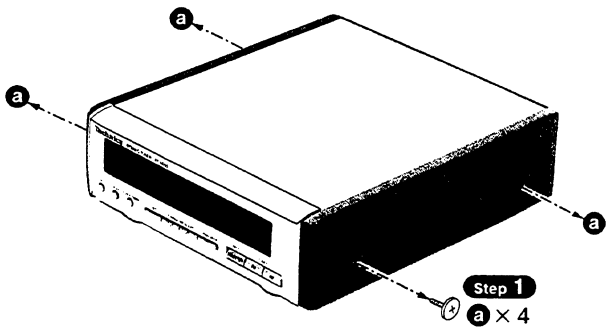
Display code	Problem or condition	Correction procedure
U70 CD (displayed automatically)	A bus-line communications error has occurred as a result of the flat cables being inserted incorrectly, thus preventing the system from operating. 1.If "U70 CD" is displayed on the stereo tuner, the CD Player cannot be operated by remote control.	 1. To check for correct insertion of the flat cables. ①Insert each connector until you hear a click. ②Insert the flat cables at the back of the unit in the order indicated. Make sure the white side of the cable is on your right side.  2. Breakage of flat cable. (Check and replace as necessary.) 3. If the problem is not corrected by items (1.) and (2.) above, this indicates a faulty IC. **ST-HD50/60:** IC901 (M38197MA146F) **SL-HD60:** IC403 (LC66356B4H02) Check these IC's and replace as necessary.
＊Good-bye＊	When the power switch is switched on, it automatically switches back off, making it impossible to switch power on.	● Faulty Stereo Tuner (ST-HD50) output IC (IC501). (When a DC voltage is applied to the speaker terminals.)

■ Operation Checks and Main Component Replacement Procedures

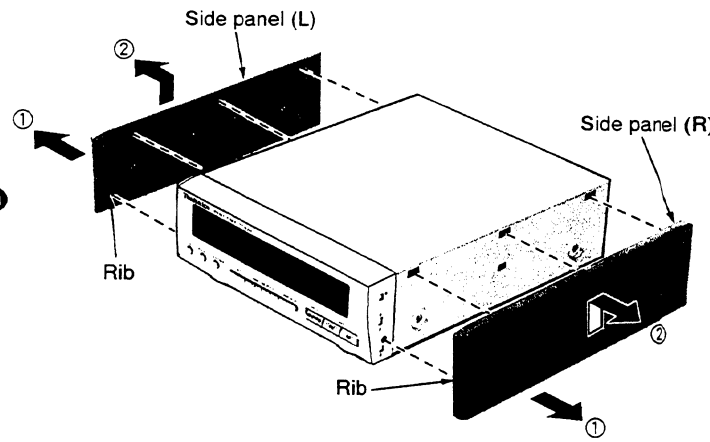
NOTE 1. This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.

2. For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.

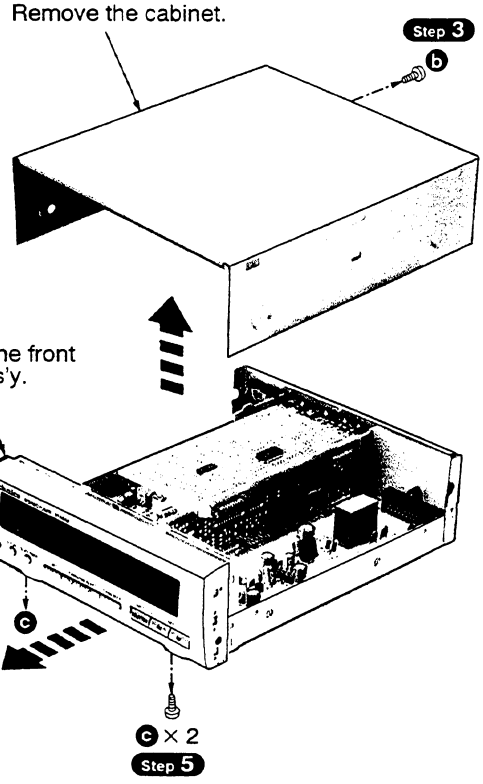
1. Checking for the tuner P.C.B. and FL P.C.B.



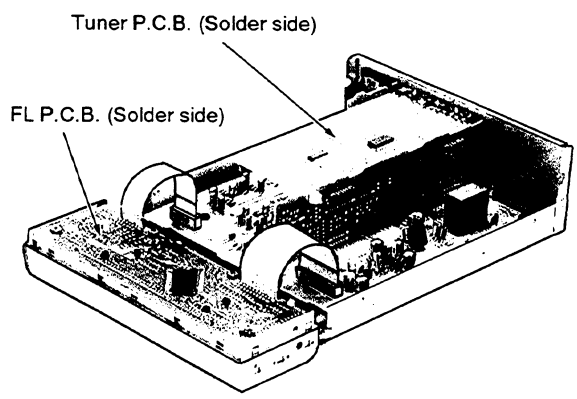
Step 2
Remove the side panel (L),(R).
• Spread the lower part of the side panels in the direction of arrow (➡①) to release the ribs, and then lift to remove the side panels (➡②).



Step 4
Remove the cabinet.

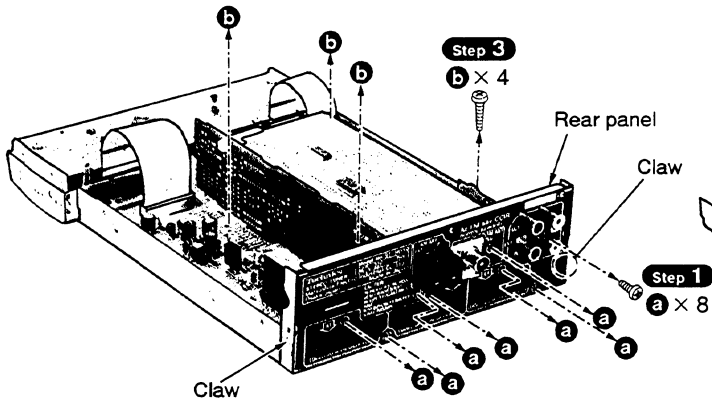


• **Check the tuner P.C.B. and FL P.C.B. as shown below.**



2. Checking for the main P.C.B.

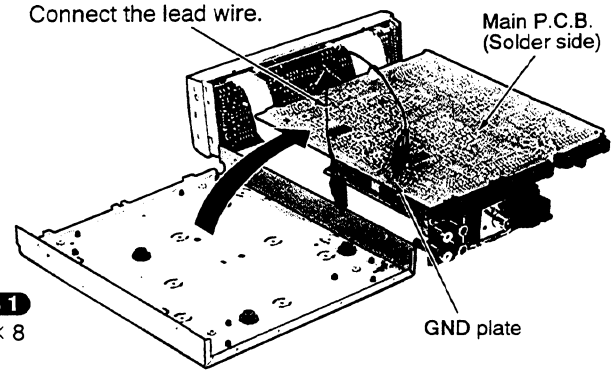
• Follow Step 1 ~ Step 6 in item 1 on page 4.



Step 2
Release the 2 claws, and then remove the rear panel.

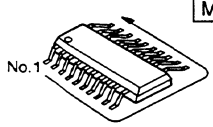
• **Check the main P.C.B. as shown below.**

Step 4
Connect the lead wire.

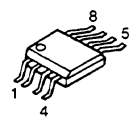


■ Type Illustration of ICs, Transistors and Diodes

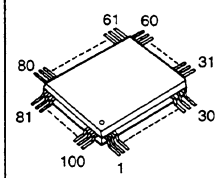
LA1832MH-TEL	24PIN	
LC7218M-TE-L	24PIN	
NJU7313AMT2	30PIN	
M62425FPE1	36PIN	



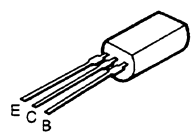
M5218AFPE3
M5219FPTA



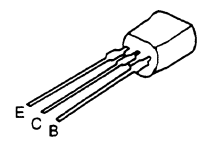
M38197MA146F



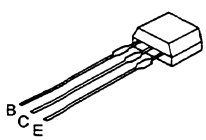
2SC3940AQSTA

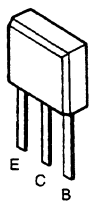


2SB621AQRSTA



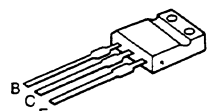
2SD2144STA
DTC143XSTP



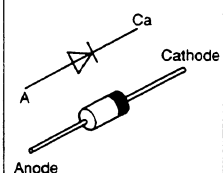


2SA1309AQSTA
2SC2785FETA
2SC2787LTA
2SC3311AQSTA
2SC3311ARSTA
UN4111AITA
UN4115TA
UN4214AITA

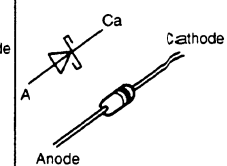
2SB1417PQTA
2SD2137PQTA



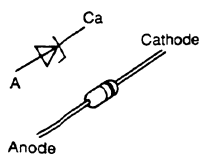
RL1N4003N02



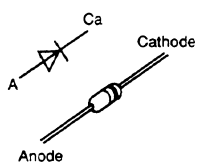
MA719TA

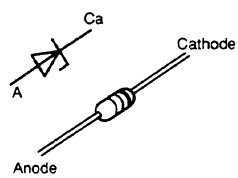


MA4150MTA
MA4300MTA



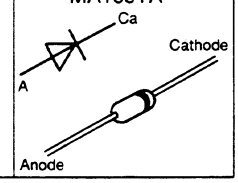
MA185TA





MA4039MTA
MA4051MTA
MA4062HTA
MA4082LTA

1SS291TA
MA165TA



■ To Supply Power Source

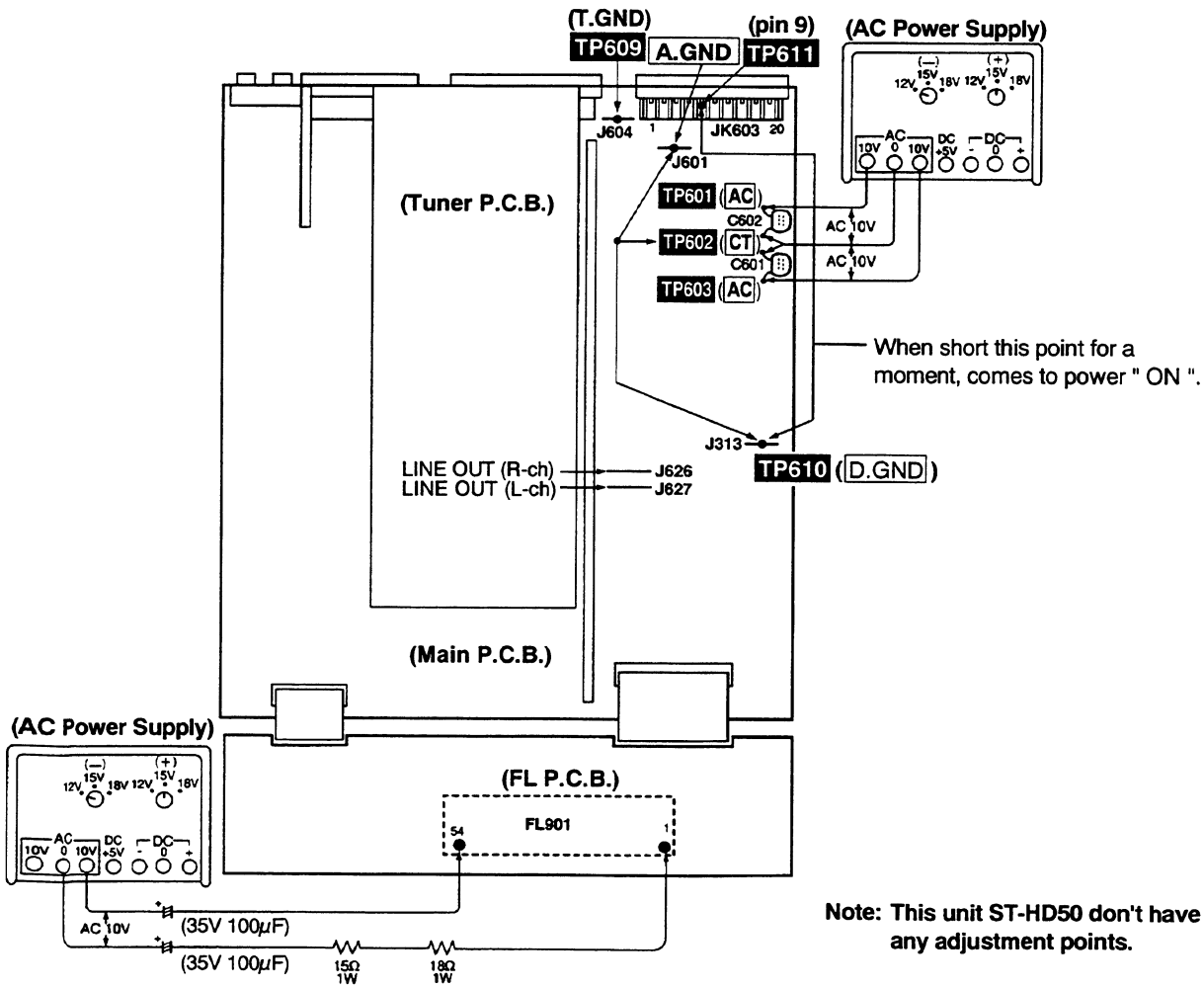
This unit ST-HD50 is designed to operate on power supplied from the Amplifier SE-HD50. When operating the unit ST-HD50 alone for testing and servicing, without having power supplied from the Amplifier SE-HD50, use the following method.

Power Supply to Main Circuit

1. Short the section between the test points TP602 (CT) and TP610 (D.GND), and as well as the section between the test points A. GND (J601) and TP610 (D.GND).
2. Connect the 10 V AC power through the capacitor (35V 100μF) to pin 1 of the indicator module FL901 and the GND terminal through the capacitor (35V 100μF) to pin 57 of the same FL901 module.
3. Apply 10 V AC power to the section between the point TP601 (AC) and the point TP602 (CT) as well as the section between the point TP603 (AC) and the point TP602 (CT). This unit comes to stand-by mode.
4. Short the section between the jumper TP611 (JK603-pin 9) and the point TP610 (D.GND) for a moment. The main circuit comes to power ON mode. (Whenever this operation is performed, power, ON/OFF mode is repeated.)

To Check Signals

Connect the oscilloscope or the speaker with the built-in amplifier to the section between the point J626 [LINE OUT (R-ch)] and the point TP610 (D.GND) as well as the section between the point J627 [LINE OUT (L-ch)] and the point TP610 (D.GND) as shown in Fig. 1, and check if the signals are outputting from this unit.



Note: This unit ST-HD50 don't have any adjustment points.

Fig. 1

■ Schematic Diagram

Page

A TUNER CIRCUIT 8, 9
B CONNECTOR CIRCUIT 10
C INPUT/OUTPUT CIRCUIT 10
D MAIN CIRCUIT ..... 10 ~ 12
E FL CIRCUIT 13, 14
F OPERATION CIRCUIT 14

- **This schematic diagram may be modified at any time with the development of new technology.**

Notes:

- **S901** : Record timer switch (⏲ REC)
- **S902** : Play timer switch (⏲ PLAY)
- **S903** : Clock/Timer switch (CLOCK/TIMER)
- **S904** : Set switch (SET)
- **S905,906** : Tuning/Time adjust switch (TUNING/TIME ADJUST)
  (S905: DOWN, S906: UP)
- **S907** : Tuning mode select switch (TUNING)
- **S908** : Source input select switch (INPUT SELECTOR)
- **S909** : FM band select switch (TUNER, FM)
- **S910** : AM band select switch (TUNER, AM)

- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
  No mark: Power ON

- Voltage values and waveform are measured as indicated in the schematic diagram when test points between **TP602** and **TP610**, and between **TP610** and **A. GND**, and between **TP609** and **A. GND** are shoted.
  No mark: FM MODE ( ): AM MODE

- Important safety notice:
  Components identified by ⚠ mark have special characteristics important for safety.
  Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.

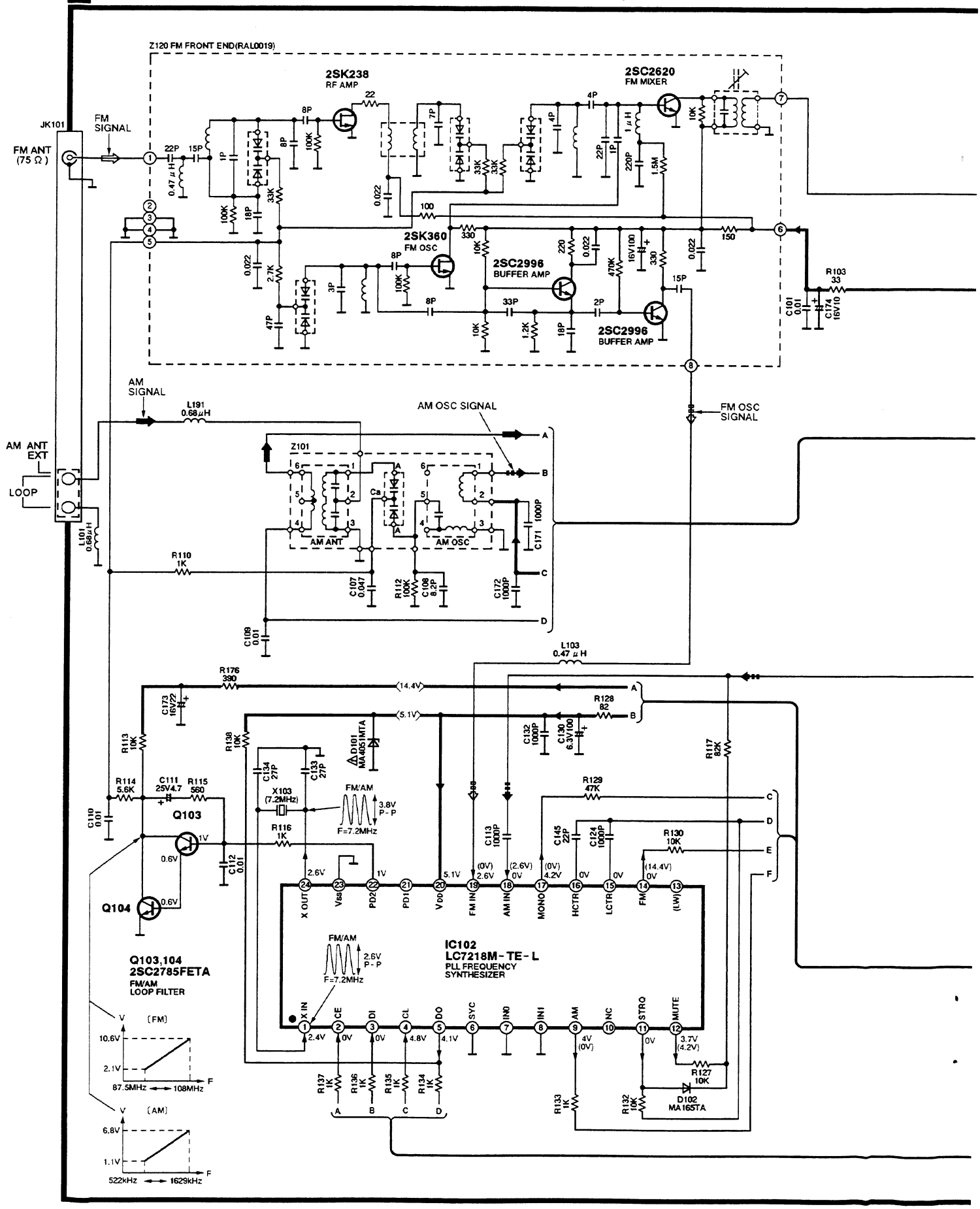
- **Caution!**
  IC and LSI are sensitive to static electricity.
  Secondary trouble can be prevented by taking care during repair.
  Cover the parts boxes made of plastics with aluminum foil.
  Ground the soldering iron.
  Put a conductive mat on the work table.
  Do not touch the legs of IC or LSI with the fingers directly.

- **Voltage and signal line**

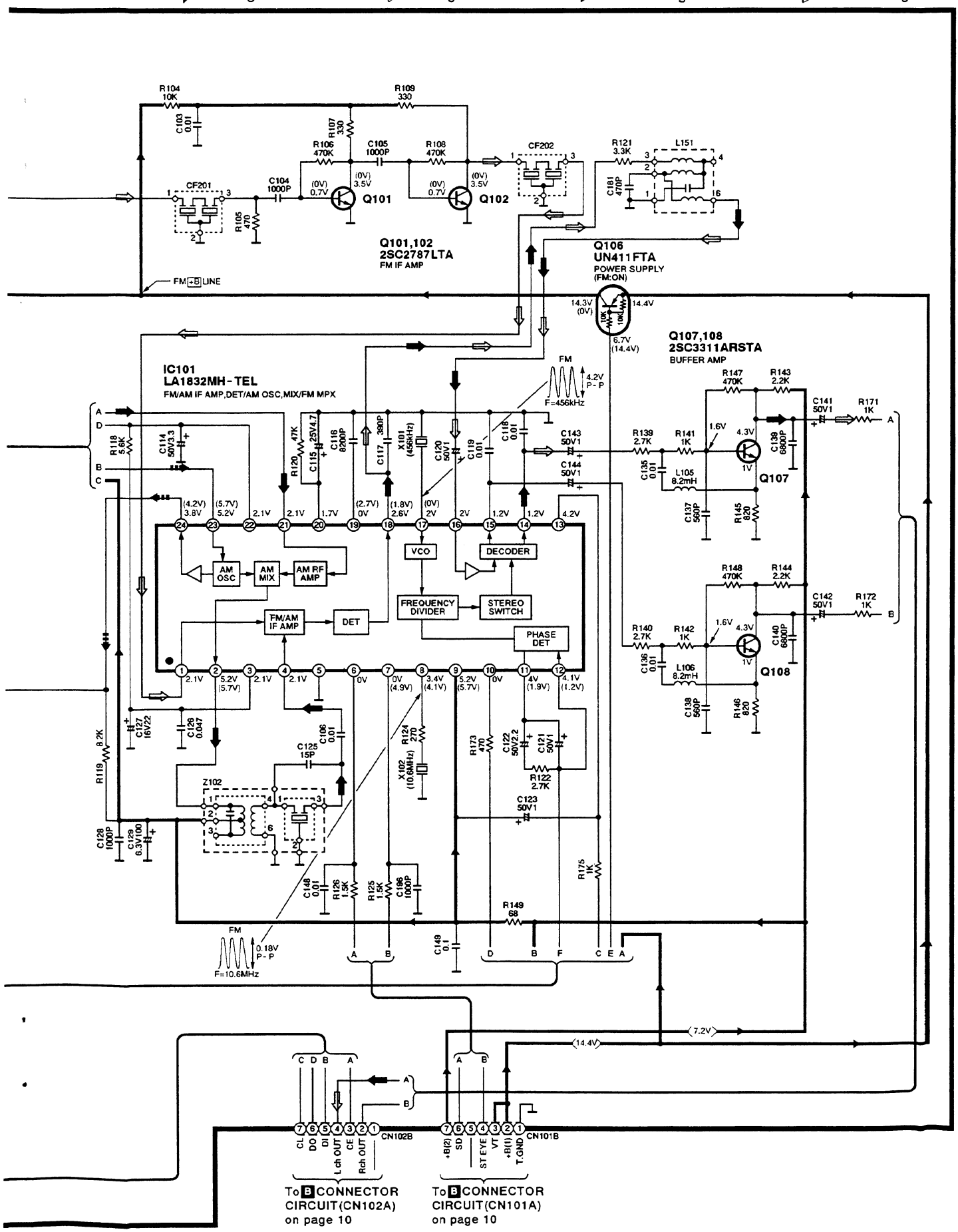
: Positive voltage line
: Negative voltage line
: AM signal line
: FM signal line
: AM OSC signal line
: AM OSC signal line
: REC OUT signal line

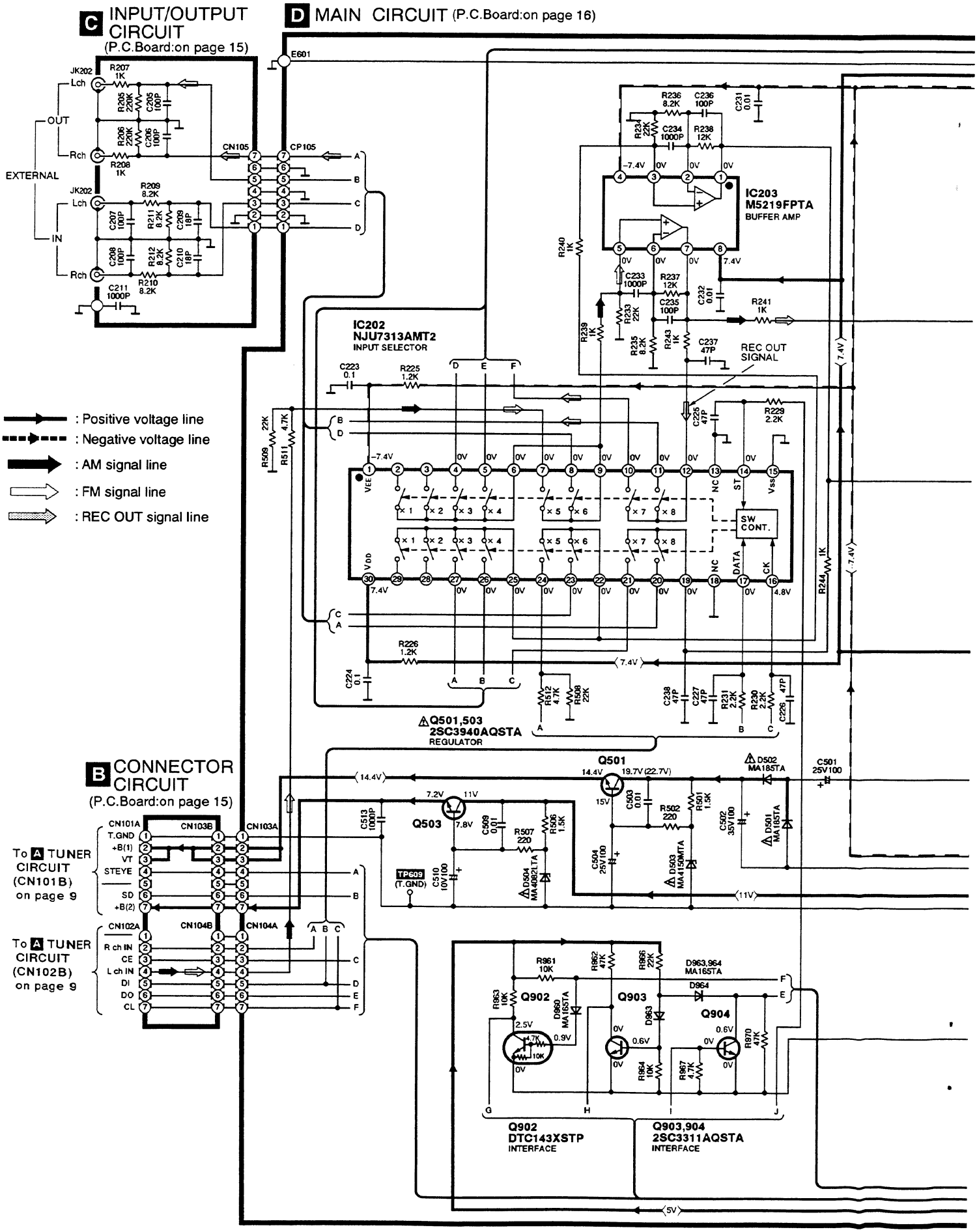
A TUNER CIRCUIT (P.C.Board:on page 15)

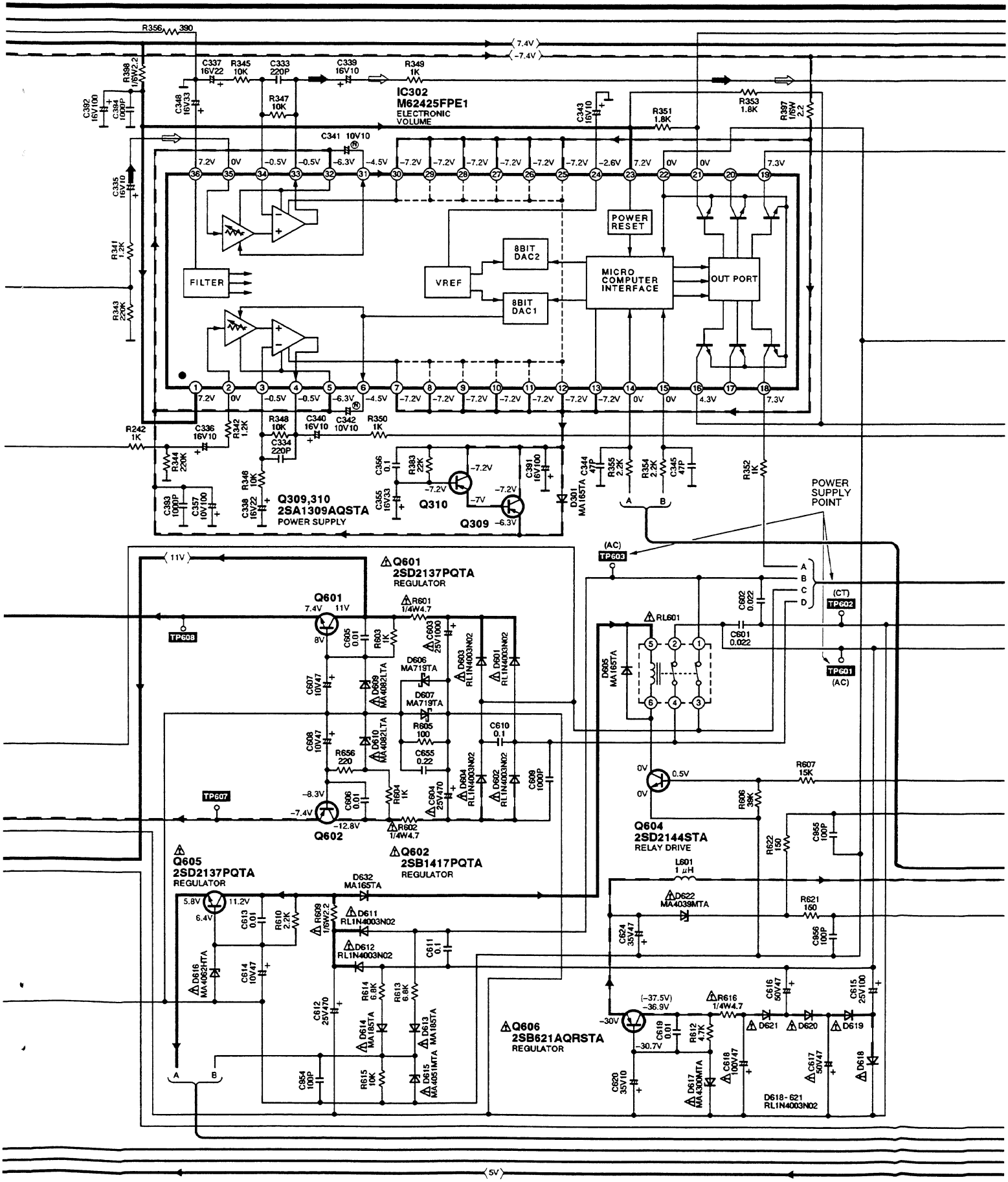
: Positive voltage line



: AM signal line : FM signal line : AM OSC signal line : AM OSC signal line

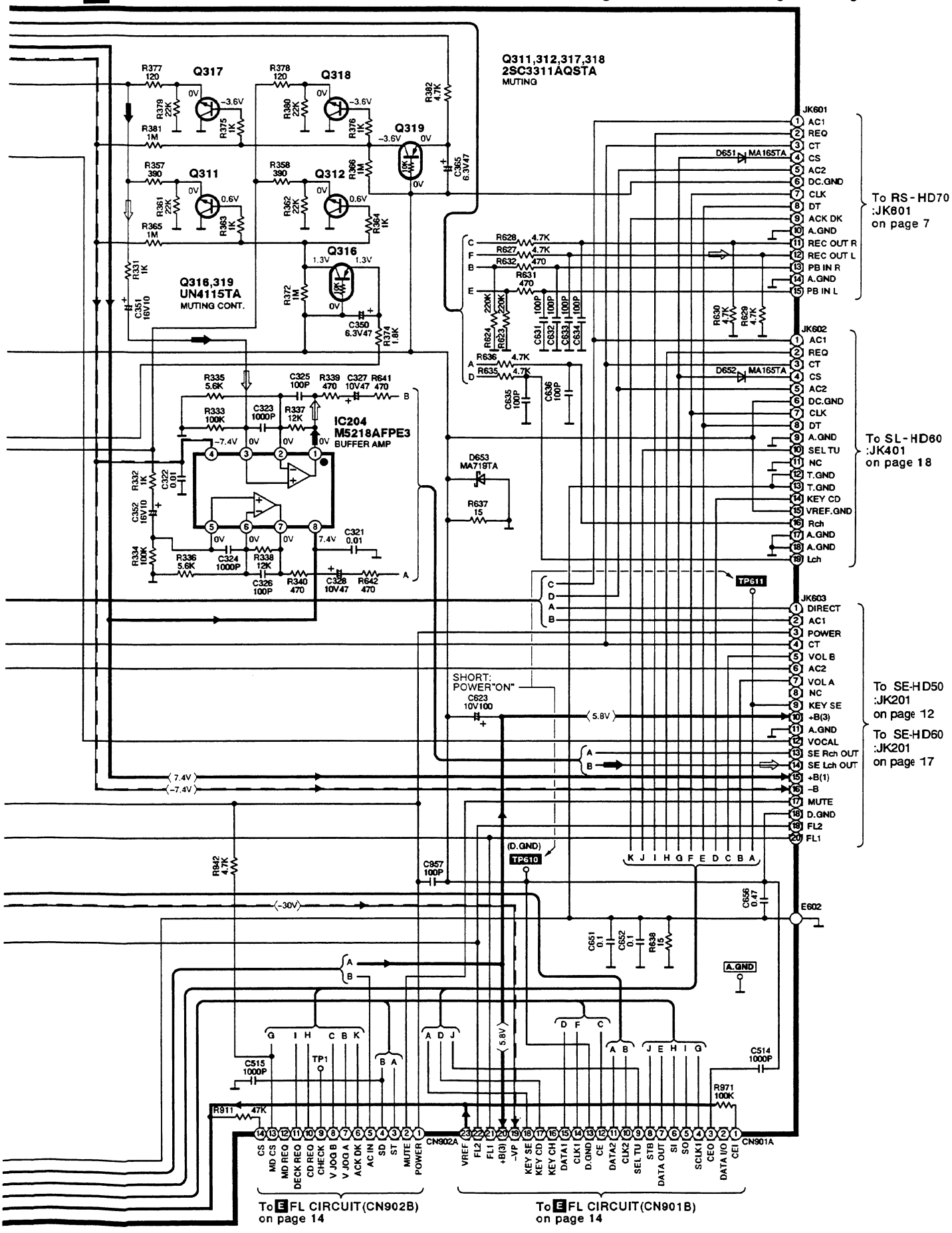



C INPUT/OUTPUT CIRCUIT
(P.C.Board:on page 15)
D MAIN CIRCUIT (P.C.Board:on page 16)
B CONNECTOR CIRCUIT
(P.C.Board:on page 15)
: Positive voltage line
: Negative voltage line
: AM signal line
: FM signal line
: REC OUT signal line
IC202
NJU7313AMT2
INPUT SELECTOR
IC203
M5219FPTA
BUFFER AMP
REC OUT SIGNAL
⚠Q501,503
2SC3940AQSTA
REGULATOR
Q501
Q502
Q503
Q902
Q903
Q904
Q902
DTC143XSTP
INTERFACE
Q903,904
2SC3311AQSTA
INTERFACE
SW CONT.
To A TUNER CIRCUIT (CN101B) on page 9
To A TUNER CIRCUIT (CN102B) on page 9
EXTERNAL
OUT
IN
Lch
Rch
JK202
E601
CN105
CP105
CN101A
CN103B
CN103A
CN102A
CN104B
CN104A
T.GND
+B(1)
VT
STEYE
SD
+B(2)
R ch IN
CE
L ch IN
DI
DO
CL
14.4V
11V
7.4V
5V
0V


IC302
M62425FPE1
ELECTRONIC VOLUME
FILTER
VREF
8BIT DAC2
8BIT DAC1
MICRO COMPUTER INTERFACE
POWER RESET
OUT PORT
Q309,310
2SA1309AQSTA
POWER SUPPLY
Q310
Q309
POWER SUPPLY POINT
Q601
2SD2137PQTA
REGULATOR
Q602
2SB1417PQTA
REGULATOR
Q604
2SD2144STA
RELAY DRIVE
Q605
2SD2137PQTA
REGULATOR
Q606
2SB621AQRSTA
REGULATOR
RL601
L601
1 μH
D618-621
RL1N4003N02

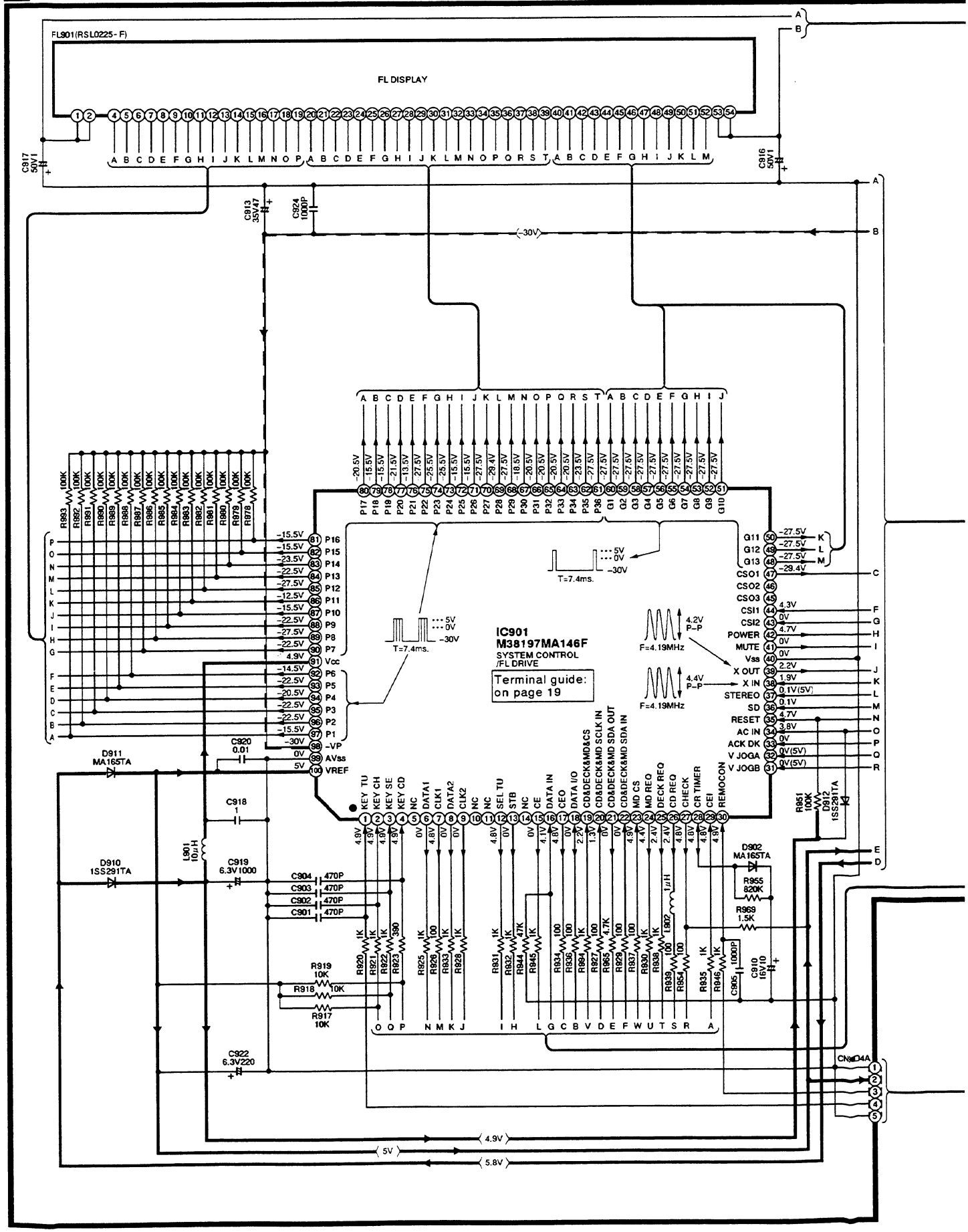
D MAIN CIRCUIT (P.C.Board:on page 16)

: Positive voltage line : Negative voltage line

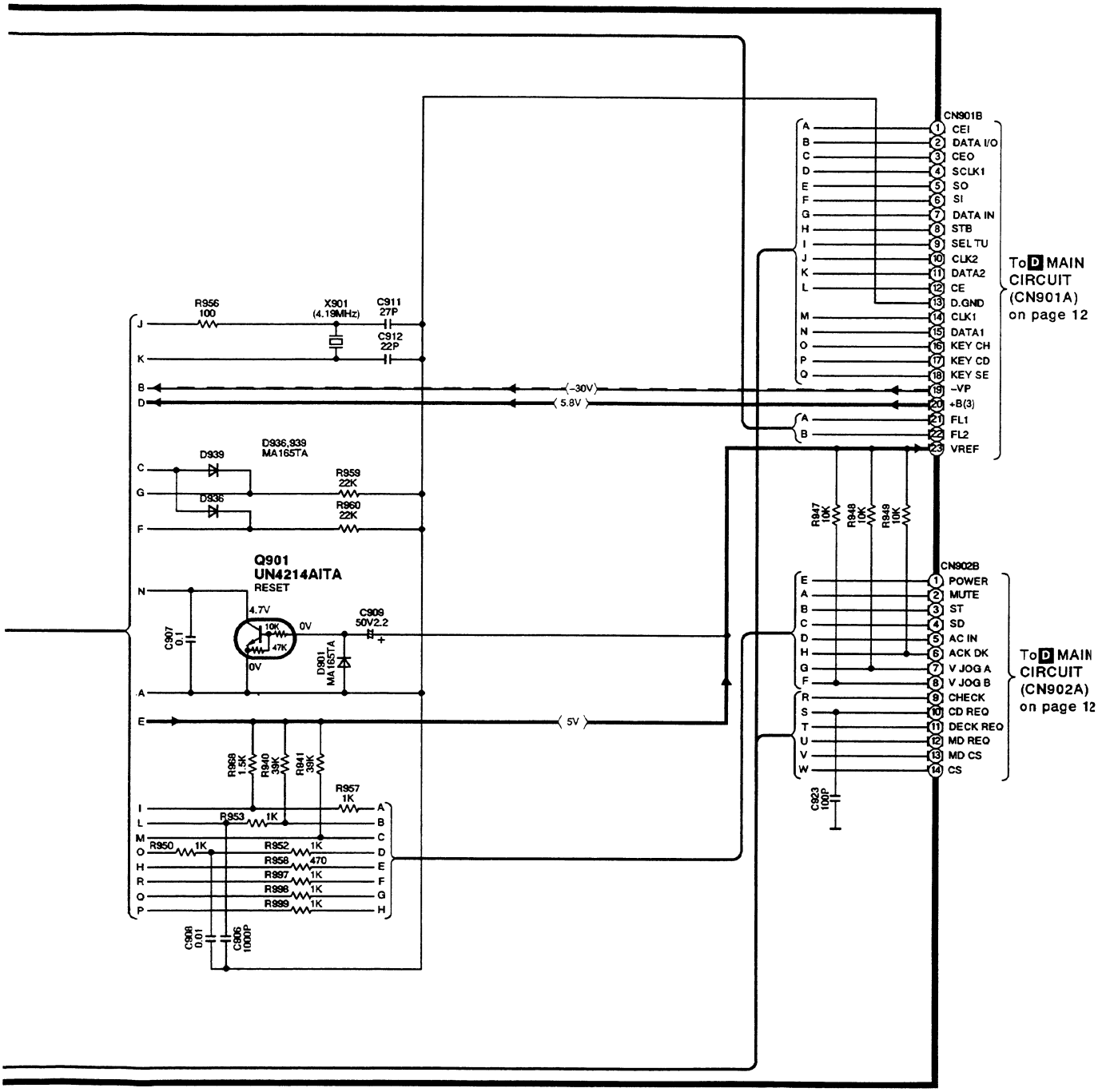


E FL CIRCUIT (P.C.Board:on page 17)

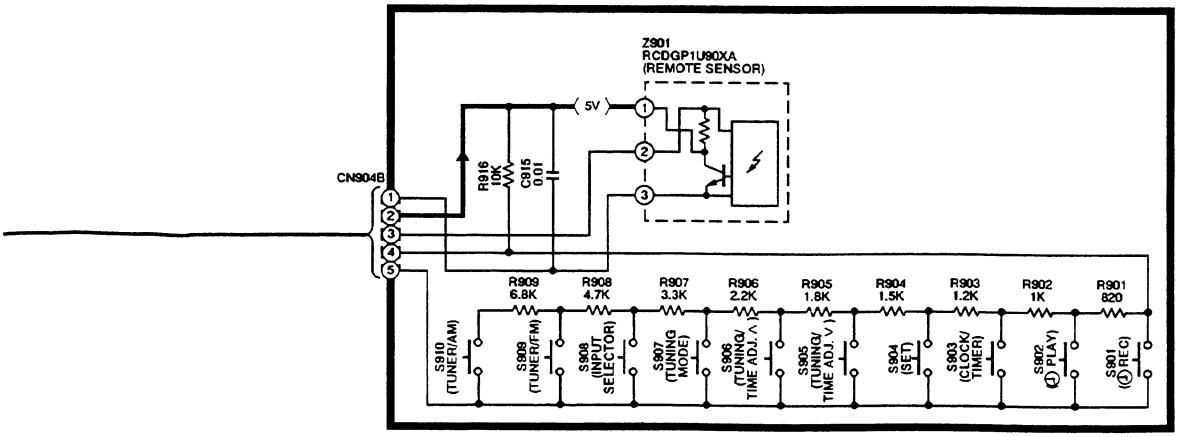
: AM signal line : FM signal line : REC OUT signal line



: Positive voltage line : Negative voltage line



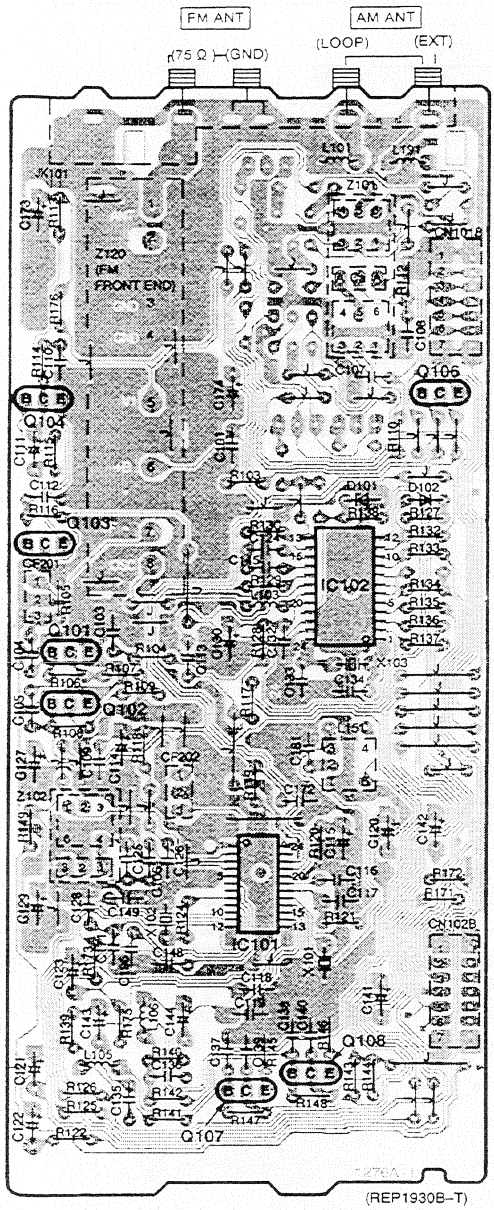
F OPERATION CIRCUIT (P.C.Board:on page 17)



■ Printed Circuit Board Diagram

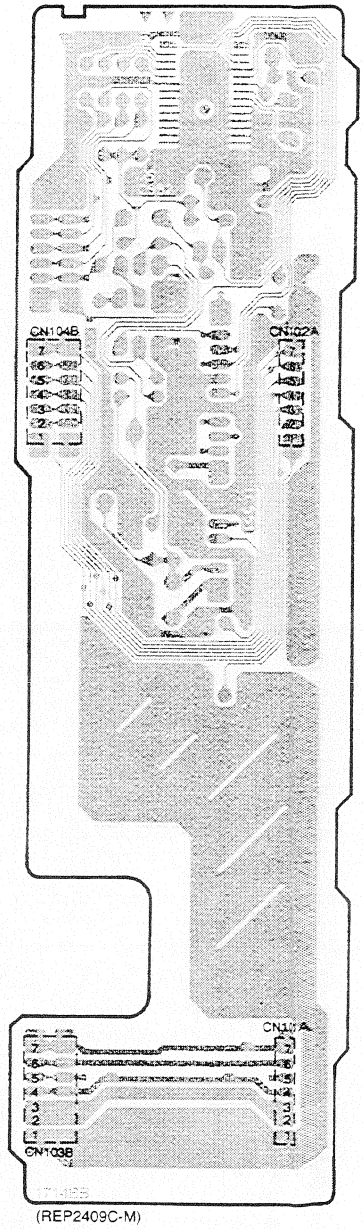
- This circuit board diagram may be modified at any time with the development of new technology.

A TUNER P.C.B.



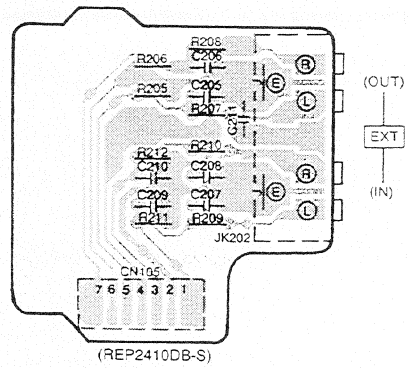
(REP1930B-T)

B CONNECTOR P.C.B.



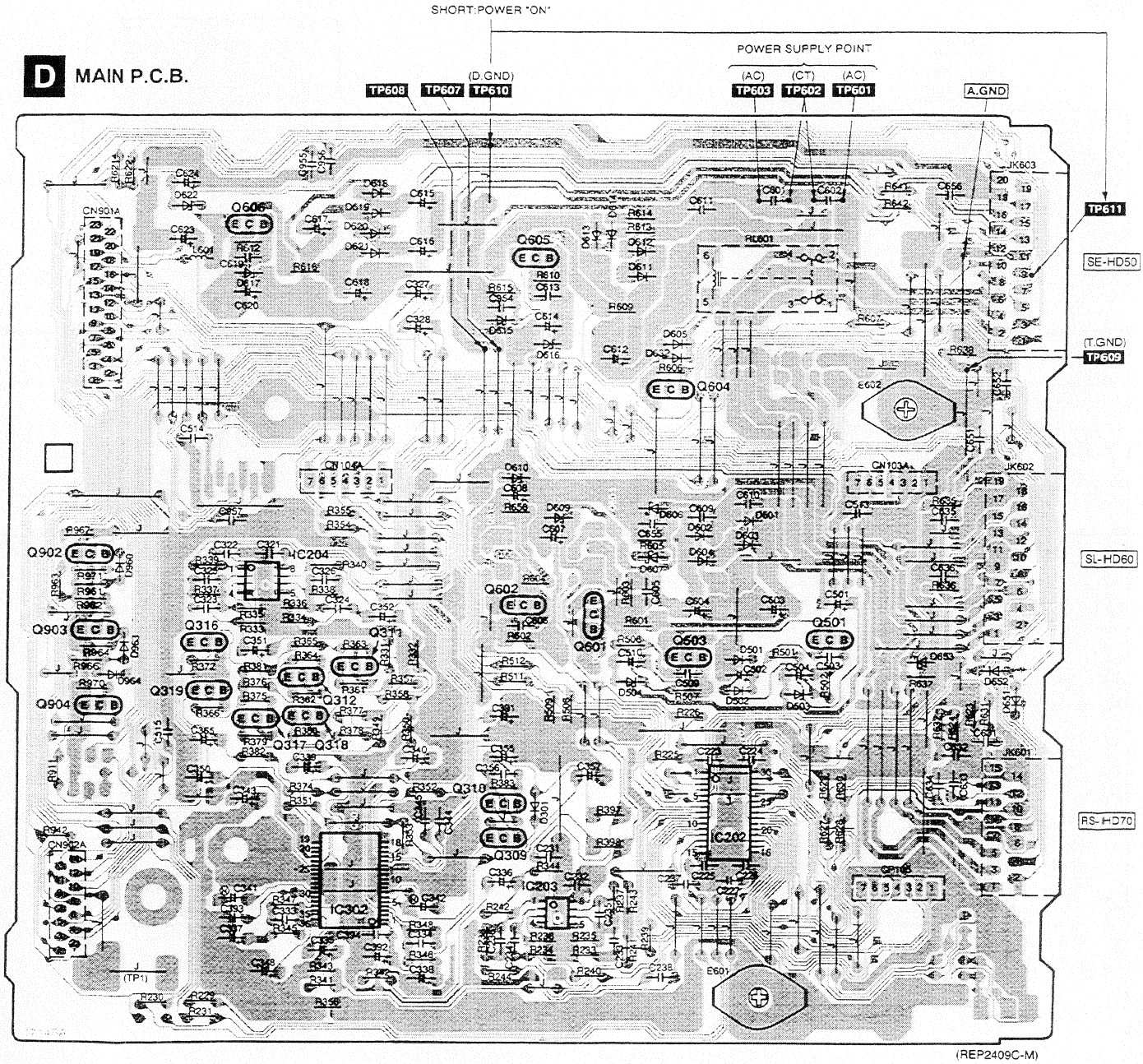
(REP2409C-M)

C INPUT/OUTPUT P.C.B.

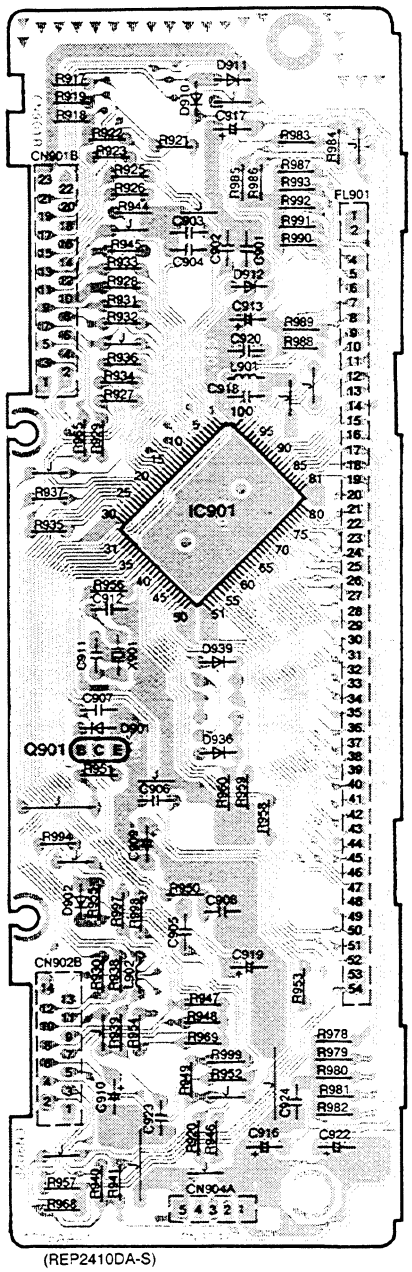


(REP2410DB-S)

D MAIN P.C.B.

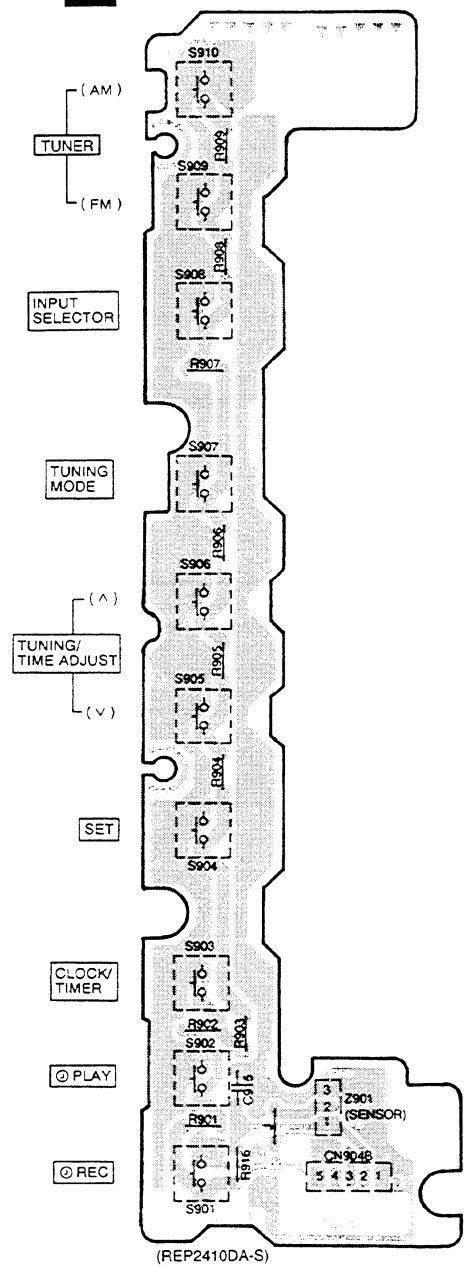

SHORT:POWER "ON"
POWER SUPPLY POINT
(D.GND)
TP608
TP607
TP610
(AC)
(CT)
(AC)
TP603
TP602
TP601
A.GND
TP611
SE-HD50
(T.GND)
TP609
SL-HD60
RS-HD70
Q606
Q605
Q604
Q602
Q601
Q603
Q501
Q902
Q903
Q904
Q316
Q319
Q312
Q317
Q318
Q310
Q309
IC204
IC302
IC203
IC202
CN901A
CN902A
CN103A
JK603
JK602
JK601
(TP1)
(REP2409C-M)

E FL P.C.B.



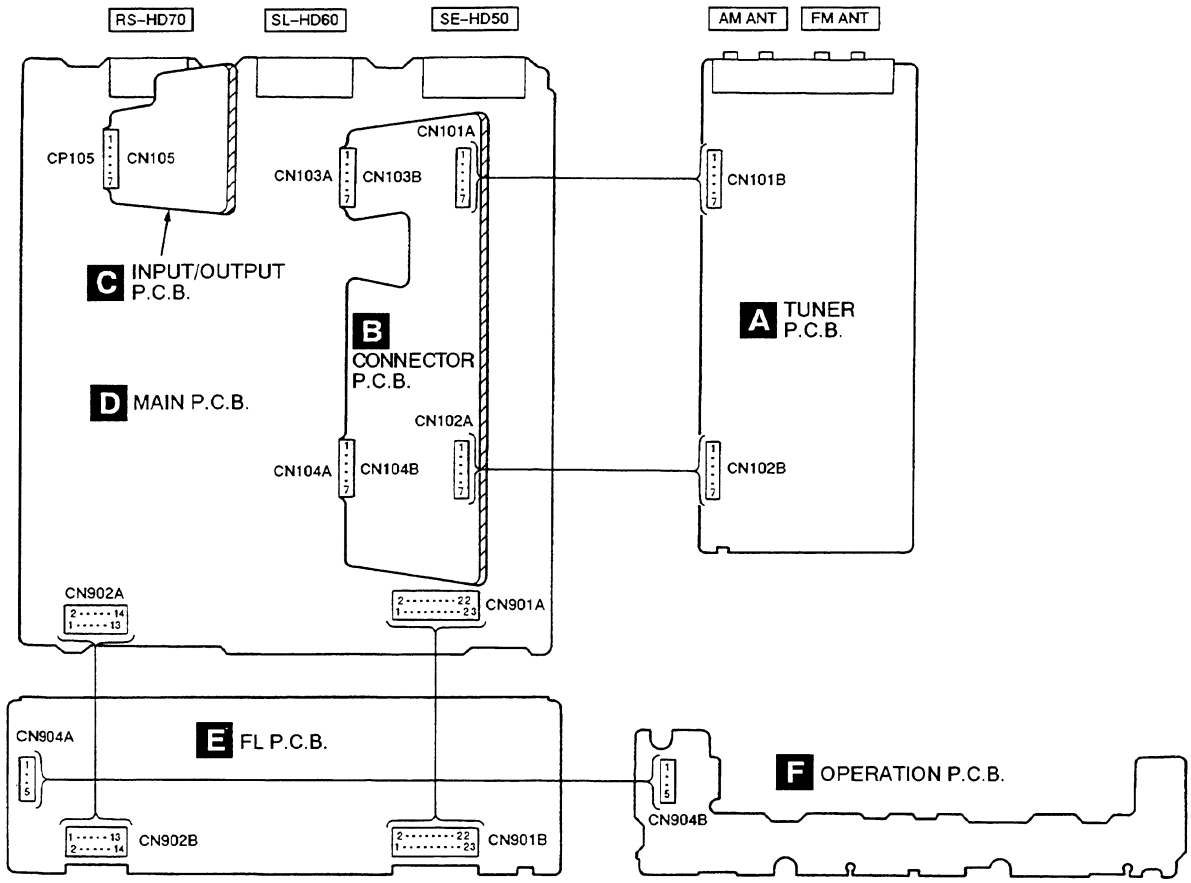
(REP2410DA-S)

F OPERATION P.C.B.



(REP2410DA-S)

■ Wiring Connection Diagram



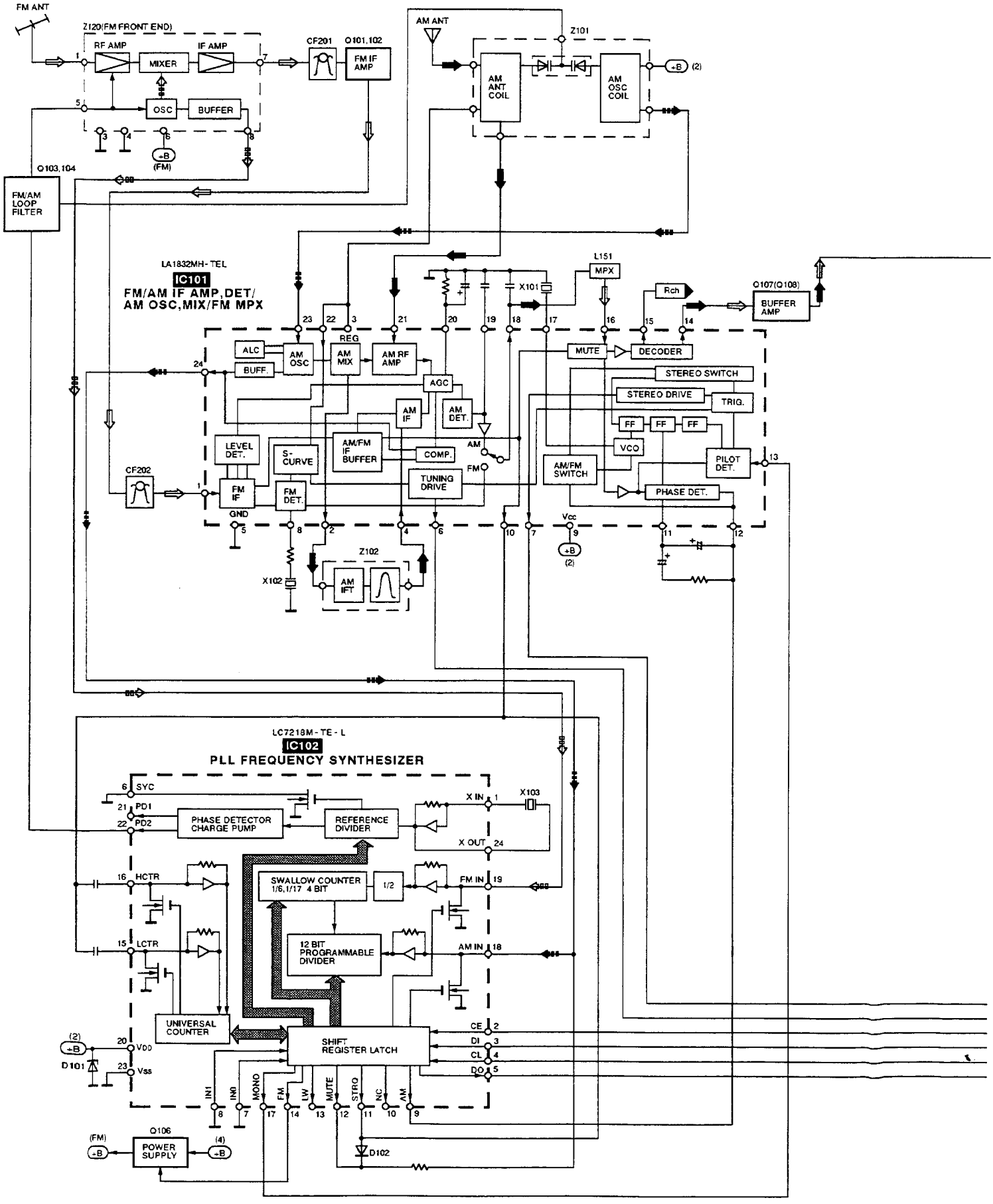
■ Terminal Function of IC's

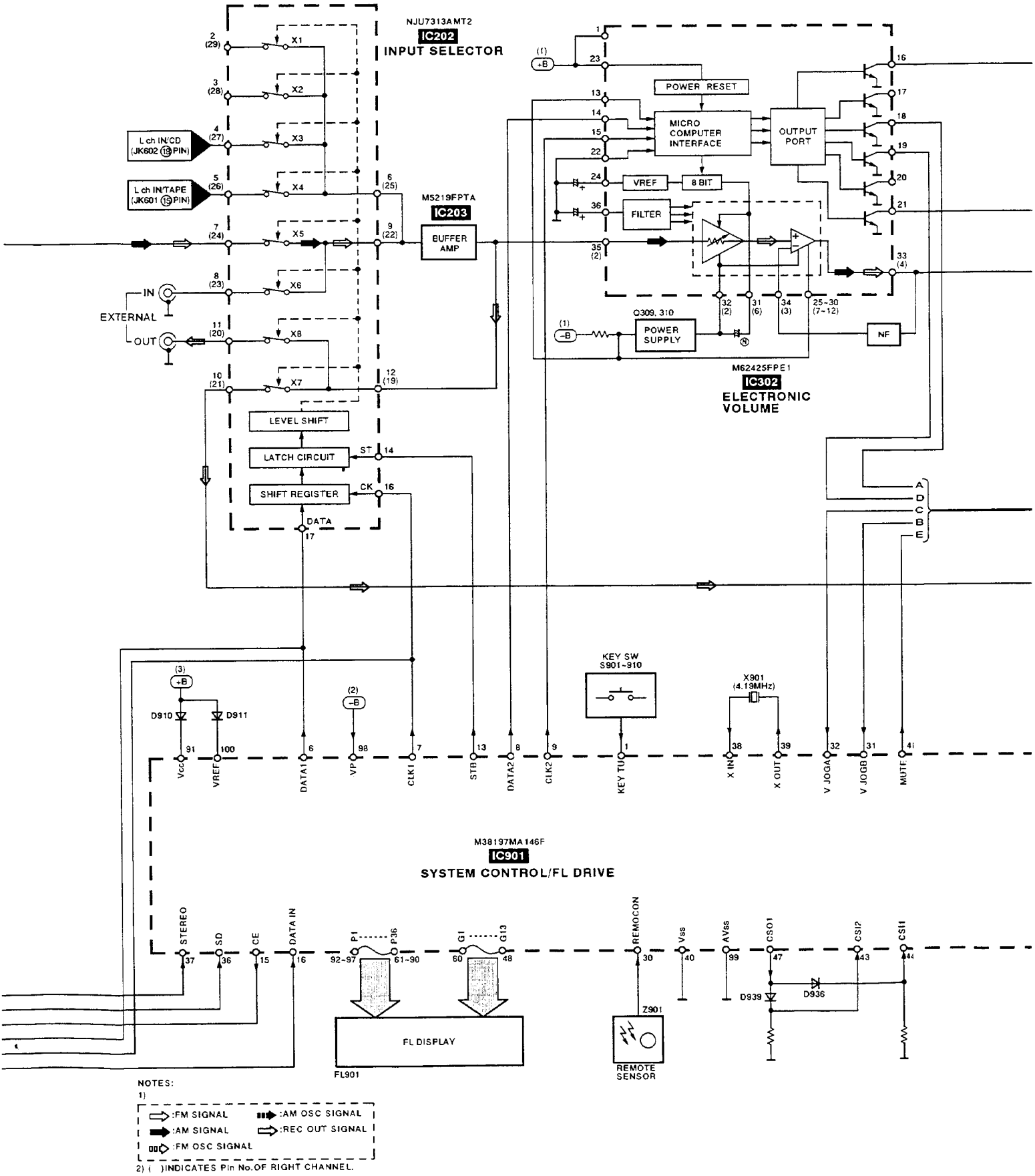
• IC901 (M38197MA146F) : SYSTEM CONTROL/FL DRIVE

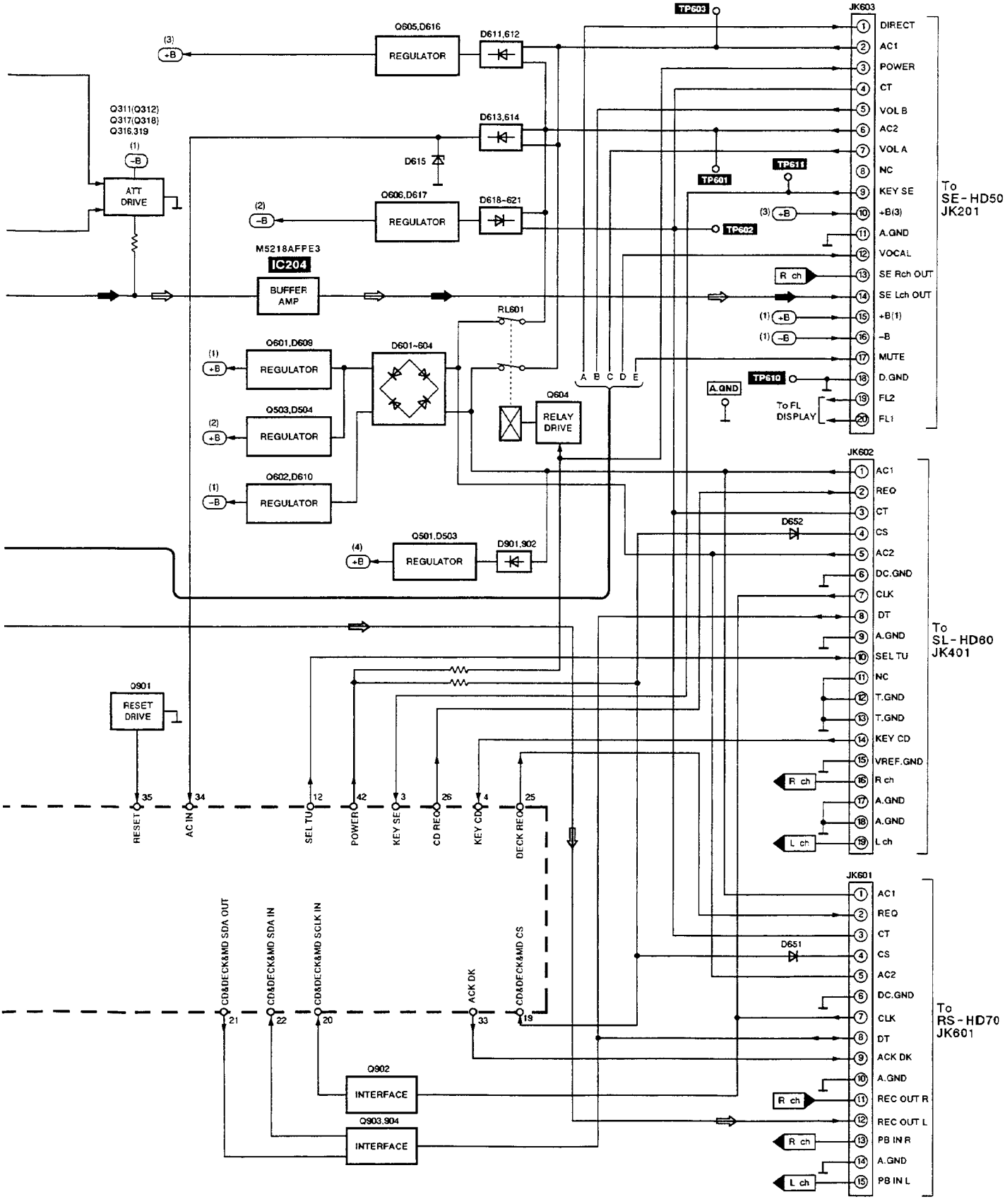
Pin No.	Terminal Name	I/O	Function
1	KEY-TU	I	Tuner operation switch signal input
2	KEY-CH	I	Input selector operation switch signal input
3	KEY-SE	I	SE-HD50 operation switch signal input
4	KEY-CD	I	SL-HD60 operation switch signal input
5	NC	–	Not used, open
6	DATA 1	O	Serial data output terminal
7	CLK 1	O	Serial clock signal output terminal
8	DATA 2	O	Serial data output terminal
9	CLK 2	O	Serial clock signal output terminal
10,11	NC	–	Not used, open
12	SEL-TU	O	Tuner select signal output
13	STB	O	Strobe signal output
14	NC	–	Not used, open
15	CE	O	Chip enable output
16	DATA IN	I	Serial data input terminal
17	CEO	O	Serial data output terminal for (E,EG) areas
18	DATA I/O	I/O	Not used, connected to GND
19	CD & DECK & MD CS	I	Serial data input terminal
20	CD & DECK & MD SCLK IN	I	Serial clock signal input terminal
21	CD & DECK & MD SDA OUT	O	Serial data output terminal
22	CD & DECK & MD SDA IN	I	Serial data input terminal
23	MD CS	I	Chip select signal input for MD
24	MD REQ	O	Request signal output for MD
25	DECK REQ	O	Request signal output for RS-HD70
26	CD REQ	O	Request signal output for SL-HD60
27	CHECK	O	Clock checking terminal
28	CR TIMER	I/O	Capacitor and resistor oscillation terminal
29	CEI	I	Serial data input terminal for (EG) area only
30	REMOCON	I	Remote control signal input
31	V-JOGB	I	Volume control signal input
32	V-JOGA	I	

Pin No.	Terminal Name	I/O	Function
33	ACK DK	I	Serial data input for RS-HD70
34	AC IN	I	AC power in detection signal input
35	RESET	I	Reset signal input
36	SD	I	SD control signal input for tuner circuit
37	STEREO	I	STEREO signal input for tuner circuit
38	XIN	I	Connected to the ceramic oscillator
39	XOUT	O	
40	Vss	–	GND terminal
41	MUTE	O	Muting control signal output
42	POWER	O	Power ON/OFF control signal output
43	CSI 2	I	Connect to GND through the resistor
44	CSI 1	I	
45,46	CSO 3, CSO2	O	Not used, open
47	CSO 1	O	Connect to GND through the diode
48~60	G13 ~ G1	O	Grid control signal output
61~90	P36 ~ P7	O	Segment control signal output
91	VCC	–	Power supply (+5V)
92~97	P6 ~ P1	O	Segment control signal output
98	–VP	–	Negative power supply
99	AVSS	–	Connected to GND
100	VREF	–	Reference voltage input terminal

■ Block Diagram




NJU7313AMT2
IC202
INPUT SELECTOR
L ch IN/CD (JK602 13PIN)
L ch IN/TAPE (JK601 15PIN)
IN
EXTERNAL
OUT
X1
X2
X3
X4
X5
X6
X8
X7
M5219FPTA
IC203
BUFFER AMP
LEVEL SHIFT
LATCH CIRCUIT
SHIFT REGISTER
DATA
ST
CK
POWER RESET
MICRO COMPUTER INTERFACE
OUTPUT PORT
VREF
8 BIT
FILTER
Q309, 310
POWER SUPPLY
NF
M62425FPE1
IC302
ELECTRONIC VOLUME
KEY SW S901~910
X901 (4.19MHz)
D910
D911
M38197MA146F
IC901
SYSTEM CONTROL/FL DRIVE
STEREO
SD
CE
DATA IN
FL DISPLAY
FL901
REMOCON
Z901
REMOTE SENSOR
D939
D936
NOTES:
1)
:FM SIGNAL
:AM SIGNAL
:FM OSC SIGNAL
:AM OSC SIGNAL
:REC OUT SIGNAL
2) ( )INDICATES Pin No.OF RIGHT CHANNEL.


TP603
JK603
Q605,D616
D611,612
REGULATOR
(3) +B
DIRECT
AC1
POWER
CT
VOL B
AC2
VOL A
NC
KEY SE
+B(3)
A.GND
VOCAL
SE Rch OUT
SE Lch OUT
+B(1)
-B
MUTE
D.GND
FL2
FL1
To SE-HD50 JK201
Q311(Q312) Q317(Q318) Q316,319
(1) -B
ATT DRIVE
D613,614
D615
Q606,D617
D618~621
(2) -B
REGULATOR
TP601
TP611
TP602
M5218AFPE3
IC204
BUFFER AMP
RL601
Q601,D609
D601~604
(1) +B
REGULATOR
Q503,D504
(2) +B
REGULATOR
Q602,D610
(1) -B
REGULATOR
A B C D E
Q604
RELAY DRIVE
TP610
A.GND
To FL DISPLAY
JK602
AC1
REQ
CT
CS
AC2
DC.GND
CLK
DT
A.GND
SEL TU
NC
T.GND
T.GND
KEY CD
VREF.GND
R ch
A.GND
A.GND
L ch
D652
To SL-HD60 JK401
(4) +B
Q501,D503
REGULATOR
D901,902
Q901
RESET DRIVE
35 RESET
34 AC IN
12 SEL TU
42 POWER
3 KEY SE
26 CD REQ
4 KEY CD
25 DECK REQ
JK601
AC1
REQ
CT
CS
AC2
DC.GND
CLK
DT
ACK DK
A.GND
REC OUT R
REC OUT L
PB IN R
A.GND
PB IN L
D651
To RS-HD70 JK601
21 CD&DECK&MD SDA OUT
22 CD&DECK&MD SDA IN
20 CD&DECK&MD SCLK IN
33 ACK DK
19 CD&DECK&MD CS
Q902
INTERFACE
Q903,904
INTERFACE

■ Replacement Parts List (Electrical)

Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacture's specified parts shown in the parts list.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
*[M] Indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC101	LA1832MH-TEL	IC	[M]
IC102	LC7218M-TE-L	IC	[M]
IC202	NJU7313AMT2	IC	[M]
IC203	M5219FPTA	IC	[M]
IC204	M5218AFPE3	IC	[M]
IC302	M62425FPE1	IC	[M]
IC901	M38197MA146F	IC	[M]
		TRANSISTOR(S)	
Q101, 102	2SC2787L	TRANSISTOR	[M]
Q103, 104	2SC2785FE	TRANSISTOR	[M]
Q106	UN411FTA	TRANSISTOR	[M]
Q107, 108	2SC3311AR	TRANSISTOR	[M]
Q309, 310	2SA1309A-R	TRANSISTOR	[M]
Q311, 312	2SC3311A-Q	TRANSISTOR	[M]
Q316	UN4115	TRANSISTOR	[M]
Q317, 318	2SC3311A-Q	TRANSISTOR	[M]
Q319	UN4115	TRANSISTOR	[M]
Q501⚠	2SC3940AQSTA	TRANSISTOR	[M]
Q503⚠	2SC3940AQSTA	TRANSISTOR	[M]
Q601⚠	2SD2137PQTA	TRANSISTOR	[M]
Q602⚠	2SB1417PQTA	TRANSISTOR	[M]
Q604	2SD2144S	TRANSISTOR	[M]
Q605⚠	2SD2137PQTA	TRANSISTOR	[M]
Q606⚠	2SB621A-R	TRANSISTOR	[M]
Q901	UN4214TA	TRANSISTOR	[M]
Q902	DTC143XSTP	TRANSISTOR	[M]
Q903, 904	2SC3311A-Q	TRANSISTOR	[M]
		DIODE(S)	
D101⚠	MA4051MTA	DIODE	[M]
D102	MA165	DIODE	[M]
D301	MA165	DIODE	[M]
D501, 502⚠	MA185TA	DIODE	[M]
D503⚠	MA4150M	DIODE	[M]
D504⚠	MA4082LTA	DIODE	[M]
D601-604⚠	RL1N4003N02	DIODE	[M]
D605	MA165	DIODE	[M]
D606, 607	MA719TA	DIODE	[M]
D609, 610⚠	MA4082LTA	DIODE	[M]
D611, 612⚠	RL1N4003N02	DIODE	[M]

Ref. No.	Part No.	Part Name & Description	Remarks
D613, 614⚠	MA185TA	DIODE	[M]
D615⚠	MA4051MTA	DIODE	[M]
D616⚠	MA4062-H	DIODE	[M]
D617⚠	MA4300M	DIODE	[M]
D618-621⚠	RL1N4003N02	DIODE	[M]
D622⚠	MA4039MTA	DIODE	[M]
D632	MA165	DIODE	[M]
D651, 652	MA165	DIODE	[M]
D653	MA719TA	DIODE	[M]
D901, 902	MA165	DIODE	[M]
D910	1SS291TA	DIODE	[M]
D911	MA165	DIODE	[M]
D912	1SS291TA	DIODE	[M]
D936	MA165	DIODE	[M]
D939	MA165	DIODE	[M]
D960	MA165	DIODE	[M]
D963, 964	MA165	DIODE	[M]
		COMPONENT COMBINATION(S)	
Z101	RLA2Z002M-T	COMPONENT COMBINATION	[M]
Z102	RLI2Z006M-T	COMPONENT COMBINATION	[M]
Z120	RAL0019	FM FRONT END	[M]
Z901	RCDGP1U90XA	REMOTE SENSOR	[M]
		COIL(S)	
L101	ELESNR68MA	COIL	[M]
L103	ELEXTR47MA9	COIL	[M]
L105, 106	ELELN822KL	COIL	[M]
L151	SLM1B10M-1M	COIL	[M]
L191	ELESNR68MA	COIL	[M]
L601	ELEXT1R0KA9	COIL	[M]
L901	RLQA100JT-Y	COIL	[M]
L902	ELEXT1R0KA9	COIL	[M]
		FILTER(S)	
CF201	RLFFETNGD01L	CERAMIC FILTER	[M]
CF202	RLFFETMGD01L	CERAMIC FILTER	[M]
		OSCILLATOR(S)	
X101	RSXZ456KM07M	OSCILLATOR	[M]
X102	RLFDGT05DD	OSCILLATOR	[M]
X103	RSXC7M20S05T	OSCILLATOR	[M]

Ref. No.	Part No.	Part Name & Description	Remarks
X901	RSXC4M19S02T	OSCILLATOR	[M]
		DISPLAY TUBE	
FL901	RSL0225-F	DISPLAY TUBE	[M]
		SWITCH(ES)	
S901-910	EVQ21405R	SW	[M]
		CONNECTOR(S)	
CN105	RJU057W007	CONNECTOR (7P)	[M]
CN101A	RJT057W007-1	CONNECTOR (7P)	[M]
CN102A	RJT057W007-1	CONNECTOR (7P)	[M]
CN103A	RJT057W007-1	CONNECTOR (7P)	[M]
CN104A	RJT057W007-1	CONNECTOR (7P)	[M]
CN901A	RJS1A6823	CONNECTOR (23P)	[M]
CN902A	RJS1A6814	CONNECTOR (14P)	[M]
CN904A	RJT066H05A	CONNECTOR (5P)	[M]
CN101B	RJU057W007	CONNECTOR (7P)	[M]
CN102B	RJU057W007	CONNECTOR (7P)	[M]
CN103B	RJU057W007	CONNECTOR (7P)	[M]
CN104B	RJU057W007	CONNECTOR (7P)	[M]
CN901B	RJS1A6223-1	CONNECTOR (23P)	[M]
CN902B	RJS1A6214-1	CONNECTOR (14P)	[M]
CN904B	RJU066H05	CONNECTOR (5P)	[M]
CP105	RJT057W007-1	CONNECTOR (7P)	[M]
		GND PLATE	
E601, 602	SNE1004-2	GND PLATE	[M]
		RELAY(S)	
RL601⚠	RSY0017M-0	RELAY	[M]
		JACK(S)	
JK101	RJH5210M	ANT TERMINAL	[M]
JK202	SJF3069-5N	EXT OUT/IN	[M]
JK601	RJT065K15	CONNECTOR(15P)	[M]
JK602	RJT065K19	CONNECTOR(19P)	[M]
JK603	RJT065K20	CONNECTOR(20P)	[M]

■ Resistors and Capacitors

Notes: *Capacity values are in microfarads (μF) unless specified otherwise, P = Pico-farads (pF) F = Farads (F)
*Resistance values are in ohms, unless specified otherwise, 1K = 1,000 (OHM) 1M = 1,000k (OHM)
*[M] Indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R103	ERDS2TJ330	1/4W 33 [M]
R104	ERDS2TJ103	1/4W 10K [M]
R105	ERDS2TJ471	1/4W 470 [M]
R106	ERDS2TJ474	1/4W 470K [M]
R107	ERDS2TJ331	1/4W 330 [M]
R108	ERDS2TJ474	1/4W 470K [M]
R109	ERDS2TJ331	1/4W 330 [M]
R110	ERDS2TJ102	1/4W 1K [M]
R112	ERDS2TJ104	1/4W 100K [M]
R113	ERDS2TJ103	1/4W 10K [M]
R114	ERDS2TJ562	1/4W 5.6K [M]
R115	ERDS2TJ561	1/4W 560 [M]
R116	ERDS2TJ102	1/4W 1K [M]
R117	ERDS2TJ823T	1/4W 82K [M]
R118	ERDS2TJ562	1/4W 5.6K [M]
R119	ERDS2TJ822	1/4W 8.2K [M]
R120	ERDS2TJ473	1/4W 47K [M]
R121	ERDS2TJ332	1/4W 3.3K [M]
R122	ERDS2TJ272T	1/4W 2.7K [M]
R124	ERDS2TJ271	1/4W 270 [M]
R125, 126	ERDS2TJ152	1/4W 1.5K [M]
R127	ERDS2TJ103	1/4W 10K [M]
R128	ERDS2TJ820	1/4W 82 [M]
R129	ERDS2TJ473	1/4W 47K [M]
R130	ERDS2TJ103	1/4W 10K [M]
R132	ERDS2TJ103	1/4W 10K [M]
R133-137	ERDS2TJ102	1/4W 1K [M]
R138	ERDS2TJ103	1/4W 10K [M]
R139, 140	ERDS2TJ272T	1/4W 2.7K [M]
R141, 142	ERDS2TJ102	1/4W 1K [M]
R143, 144	ERDS2TJ222	1/4W 2.2K [M]
R145, 146	ERDS2TJ821	1/4W 820 [M]
R147, 148	ERDS2TJ474	1/4W 470K [M]
R149	ERDS2TJ680T	1/4W 68 [M]
R171, 172	ERDS2TJ102	1/4W 1K [M]
R173	ERDS2TJ471	1/4W 470 [M]
R175	ERDS2TJ102	1/4W 1K [M]
R176	ERDS2TJ391	1/4W 390 [M]
R205, 206	ERDS2TJ224T	1/4W 220K [M]
R207, 208	ERDS2TJ102	1/4W 1K [M]
R209-212	ERDS2TJ822	1/4W 8.2K [M]
R225, 226	ERDS2TJ122	1/4W 1.2K [M]
R229-231	ERDS2TJ222	1/4W 2.2K [M]
R233, 234	ERDS2TJ223	1/4W 22K [M]
R235, 236	ERDS2TJ822	1/4W 8.2K [M]
R237, 238	ERDS2TJ123	1/4W 12K [M]
R239-244	ERDS2TJ102	1/4W 1K [M]
R331, 332	ERDS2TJ102	1/4W 1K [M]
R333, 334	ERDS2TJ104	1/4W 100K [M]
R335, 336	ERDS2TJ562	1/4W 5.6K [M]
R337, 338	ERDS2TJ123	1/4W 12K [M]
R339, 340	ERDS2TJ471	1/4W 470 [M]
R341, 342	ERDS2TJ122	1/4W 1.2K [M]
R343, 344	ERDS2TJ224T	1/4W 220K [M]
R345-348	ERDS2TJ103	1/4W 10K [M]
R349, 350	ERDS2TJ102	1/4W 1K [M]
R351	ERDS2TJ182	1/4W 1.8K [M]
R352	ERDS2TJ102	1/4W 1K [M]
R353	ERDS2TJ182	1/4W 1.8K [M]
R354, 355	ERDS2TJ222	1/4W 2.2K [M]
R356-358	ERDS2TJ391	1/4W 390 [M]
R361, 362	ERDS2TJ223	1/4W 22K [M]
R363, 364	ERDS2TJ102	1/4W 1K [M]
R365, 366	ERDS2TJ105T	1/4W 1M [M]
R372	ERDS2TJ105T	1/4W 1M [M]
R374	ERDS2TJ182	1/4W 1.8K [M]
R375, 376	ERDS2TJ102	1/4W 1K [M]
R377, 378	ERDS2EJ121	1/4W 120 [M]
R379, 380	ERDS2TJ223	1/4W 22K [M]
R381	ERDS2TJ105T	1/4W 1M [M]
R382	ERDS2TJ472	1/4W 4.7K [M]
R383	ERDS2TJ223	1/4W 22K [M]
R397, 398	ERQ16NKW2R2E	1/6W 2.2 [M]
R501	ERDS2TJ152	1/4W 1.5K [M]
R502	ERDS2TJ221	1/4W 220 [M]
R506	ERDS2TJ152	1/4W 1.5K [M]
R507	ERDS2TJ221	1/4W 220 [M]
R508, 509	ERDS2TJ223	1/4W 22K [M]
R511, 512	ERDS2TJ472	1/4W 4.7K [M]
R601, 602⚠	ERD2FCVJ4R7T	1/4W 4.7 [M]
R603, 604	ERDS2TJ102	1/4W 1K [M]
R605	ERDS2TJ101	1/4W 100 [M]
R606	ERDS2TJ393	1/4W 39K [M]
R607	ERDS2TJ153	1/4W 15K [M]
R609⚠	ERQ16NKW2R2E	1/6W 2.2 [M]
R610	ERDS2TJ222	1/4W 2.2K [M]
R612	ERDS2TJ472	1/4W 4.7K [M]
R613, 614	ERDS2TJ682T	1/4W 6.8K [M]
R615	ERDS2TJ103	1/4W 10K [M]
R616⚠	ERD25FVJ4R7T	1/4W 4.7 [M]
R621, 622	ERDS2TJ151	1/4W 150 [M]
R623, 624	ERDS2TJ224T	1/4W 220K [M]
R627-630	ERDS2TJ472	1/4W 4.7K [M]
R631, 632	ERDS2TJ471	1/4W 470 [M]
R635, 636	ERDS2TJ472	1/4W 4.7K [M]
R637, 638	ERDS2TJ150T	1/4W 15 [M]
R641, 642	ERDS2TJ471	1/4W 470 [M]
R656	ERDS2TJ221	1/4W 220 [M]
R901	ERDS2TJ821	1/4W 820 [M]
R902	ERDS2TJ102	1/4W 1K [M]
R903	ERDS2TJ122	1/4W 1.2K [M]
R904	ERDS2TJ152	1/4W 1.5K [M]
R905	ERDS2TJ182	1/4W 1.8K [M]
R906	ERDS2TJ222	1/4W 2.2K [M]
R907	ERDS2TJ332	1/4W 3.3K [M]
R908	ERDS2TJ472	1/4W 4.7K [M]
R909	ERDS2TJ682T	1/4W 6.8K [M]
R911	ERDS2TJ473	1/4W 47K [M]
R916-919	ERDS2TJ103	1/4W 10K [M]
R920-922	ERDS2TJ102	1/4W 1K [M]
R923	ERDS2TJ391	1/4W 390 [M]
R925	ERDS2TJ102	1/4W 1K [M]
R926, 927	ERDS2TJ101	1/4W 100 [M]
R928	ERDS2TJ102	1/4W 1K [M]
R929	ERDS2TJ101	1/4W 100 [M]
R930-933	ERDS2TJ102	1/4W 1K [M]
R934	ERDS2TJ101	1/4W 100 [M]
R935	ERDS2TJ102	1/4W 1K [M]
R936, 937	ERDS2TJ101	1/4W 100 [M]
R938	ERDS2TJ102	1/4W 1K [M]
R939	ERDS2TJ101	1/4W 100 [M]
R940, 941	ERDS2TJ393	1/4W 39K [M]
R942	ERDS2TJ472	1/4W 4.7K [M]
R944	ERDS2TJ473	1/4W 47K [M]
R945, 946	ERDS2TJ102	1/4W 1K [M]
R947-949	ERDS2TJ103	1/4W 10K [M]
R950	ERDS2TJ102	1/4W 1K [M]
R951	ERDS2TJ104	1/4W 100K [M]
R952, 953	ERDS2TJ102	1/4W 1K [M]
R954	ERDS2TJ101	1/4W 100 [M]
R955	ERDS2TJ824	1/4W 820K [M]
R956	ERDS2TJ101	1/4W 100 [M]
R957	ERDS2TJ102	1/4W 1K [M]
R958	ERDS2TJ471	1/4W 470 [M]
R959, 960	ERDS2TJ223	1/4W 22K [M]
R961	ERDS2TJ103	1/4W 10K [M]
R962	ERDS2TJ473	1/4W 47K [M]
R963, 964	ERDS2TJ103	1/4W 10K [M]
R965	ERDS2TJ472	1/4W 4.7K [M]
R966	ERDS2TJ223	1/4W 22K [M]
R967	ERDS2TJ472	1/4W 4.7K [M]
R968, 969	ERDS2TJ152	1/4W 1.5K [M]
R970	ERDS2TJ473	1/4W 47K [M]
R971	ERDS2TJ104	1/4W 100K [M]

Ref. No.	Part No.	Values & Remarks
R978-993	ERDS2TJ104	1/4W 100K [M]
R994	ERDS2TJ102	1/4W 1K [M]
R997-999	ERDS2TJ102	1/4W 1K [M]
		CAPACITORS
C101	ECBT1C103NS5	16V 0.01U [M]
C103	ECBT1C103NS5	16V 0.01U [M]
C104, 105	ECBT1H102KB5	50V 1000P [M]
C106	ECBT1C103NS5	16V 0.01U [M]
C107	ECBT1H473ZF5	50V 0.047U [M]
C108	ECBT1H8R2KC5	50V 8.2P [M]
C109, 110	ECBT1C103NS5	16V 0.01U [M]
C111	ECEA1EKA4R7B	25V 4.7U [M]
C112	ECBT1C103NS5	16V 0.01U [M]
C113	ECBT1H102KB5	50V 1000P [M]
C114	RCE1HKA3R3BG	50V 3.3U [M]
C115	ECEA1EKA4R7B	25V 4.7U [M]
C116	ECBT1C822KS5	16V 8200P [M]
C117	ECQP1391JZ	100V 390P [M]
C118, 119	ECFR1C103KR	16V 0.01U [M]
C120, 121	ECEA1HKA010B	50V 1U [M]
C122	ECEA1HKA2R2B	50V 2.2U [M]
C123	ECEA1HKA010B	50V 1U [M]
C124	ECBT1H102KB5	50V 1000P [M]
C125	ECBT1H150JC5	50V 15P [M]
C126	ECBT1H473ZF5	50V 0.047U [M]
C127	ECEA1CKA220B	16V 22U [M]
C128	ECBT1H102KB5	50V 1000P [M]
C129, 130	ECEA0JKA101B	6.3V 100U [M]
C132	ECBT1H102KB5	50V 1000P [M]
C133, 134	ECBT1H270JU5	50V 27P [M]
C135, 136	ECBT1C103KS5	16V 0.01U [M]
C137, 138	ECBT1H561KB5	50V 560P [M]
C139, 140	ECBT1C682KR5	16V 6800P [M]
C141-144	ECEA1HKA010B	50V 1U [M]
C145	ECBT1H220JC5	50V 22P [M]
C148	ECBT1C103NS5	16V 0.01U [M]
C149	ECBT1H104ZF5	50V 0.1U [M]
C171, 172	ECBT1H102KB5	50V 1000P [M]
C173	ECEA1CKA220B	16V 22U [M]
C174	RCE1CKA100BG	16V 10U [M]
C181	ECBT1H471KB5	50V 470P [M]
C196	ECBT1H102KB5	50V 1000P [M]
C205-208	ECBT1H101KB5	50V 100P [M]
C209, 210	ECBT1H180J5	50V 18P [M]
C211	ECBT1H102KB5	50V 1000P [M]
C223, 224	ECBT1H104ZF5	50V 0.1U [M]
C225-227	ECBT1H470J5	50V 47P [M]
C231, 232	ECBT1E103ZF	25V 0.01U [M]
C233, 234	ECBT1H102KB5	50V 1000P [M]
C235, 236	ECBT1H101KB5	50V 100P [M]

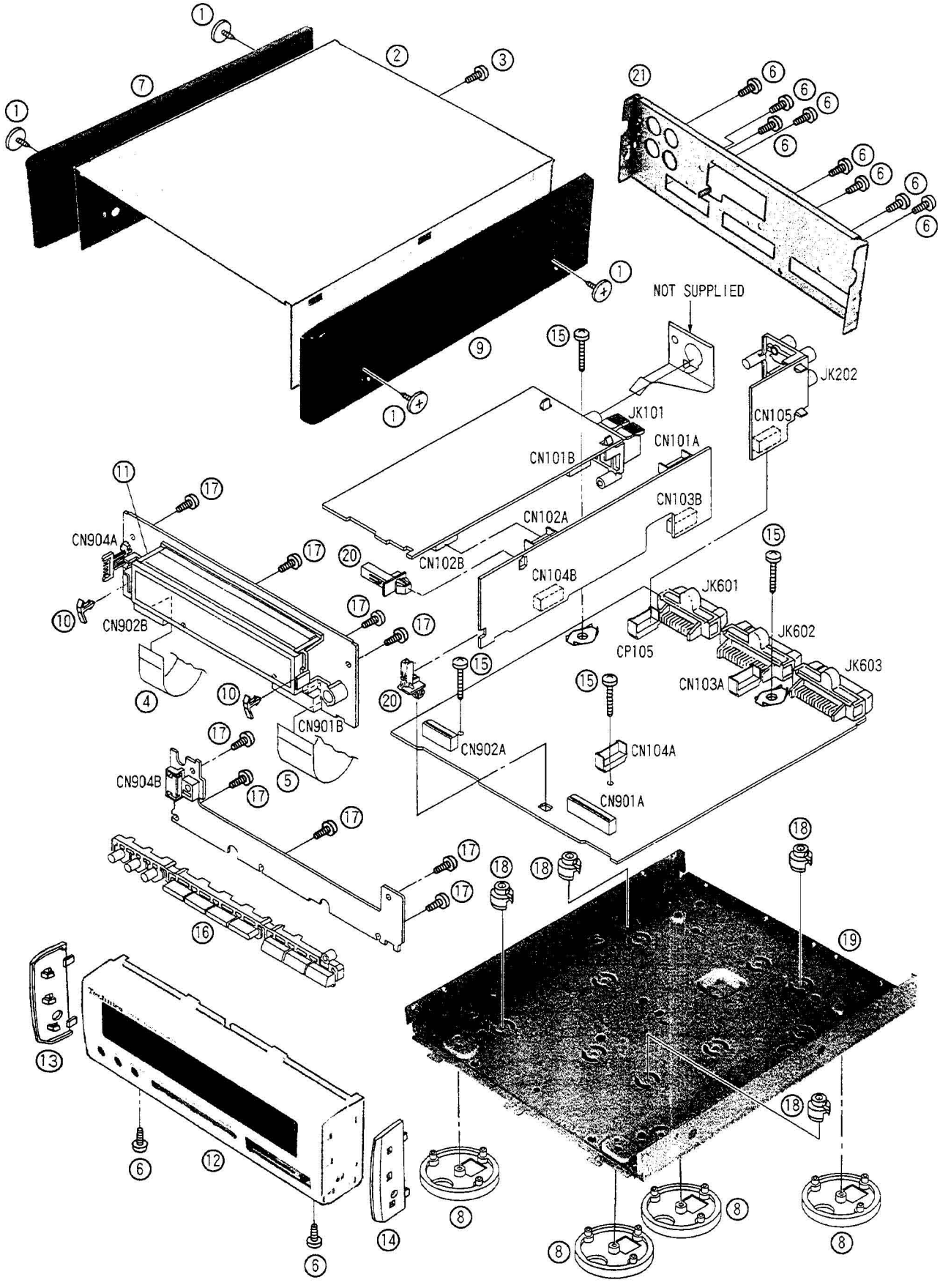
Ref. No.	Part No.	Values & Remarks
C237, 238	ECBT1H470J5	50V 47P [M]
C321, 322	ECBT1E103ZF	25V 0.01U [M]
C323, 324	ECBT1H102KB5	50V 1000P [M]
C325, 326	ECBT1H101KB5	50V 100P [M]
C327, 328	RCE1AKA470BG	10V 47U [M]
C333, 334	ECBT1H221KB5	50V 220P [M]
C335, 336	RCE1CKA100BG	16V 10U [M]
C337, 338	ECEA1CKA220B	16V 22U [M]
C339, 340	RCE1CKA100BG	16V 10U [M]
C341, 342	ECEA1AKN100B	10V 10U [M]
C343	RCE1CKA100BG	16V 10U [M]
C344, 345	ECBT1H470J5	50V 47P [M]
C348	ECEA1CKA330B	16V 33U [M]
C350	ECEA0JKA470B	6.3V 47U [M]
C351, 352	RCE1CKA100BG	16V 10U [M]
C355	ECEA1CKA330B	16V 33U [M]
C356	ECBT1H104ZF5	50V 0.1U [M]
C357	RCE1AKA101BG	10V 100U [M]
C365	ECEA0JKA470B	6.3V 47U [M]
C391, 392	ECEA1CKA101B	16V 100U [M]
C393, 394	ECBT1H102KB5	50V 1000P [M]
C501	ECEA1EKA101B	25V 100U [M]
C502	ECA1VM101B	35V 100U [M]
C503	ECBT1E103ZF	25V 0.01U [M]
C504	ECEA1EKA101B	25V 100U [M]
C509	ECBT1E103ZF	25V 0.01U [M]
C510	RCE1AKA101BG	10V 100U [M]
C513-515	ECBT1H102KB5	50V 1000P [M]
C601, 602	ECKT1H223ZF	50V 0.022U [M]
C603⚠	ECA1EM102B	25V 1000U [M]
C604⚠	RCE1EM471BV	25V 470U [M]
C605, 606	ECBT1E103ZF	25V 0.01U [M]
C607, 608	RCE1AKA470BG	10V 47U [M]
C609	ECBT1H102KB5	50V 1000P [M]
C610, 611	ECBT1H104ZF5	50V 0.1U [M]
C612	RCE1EM471BV	25V 470U [M]
C613	ECBT1E103ZF	25V 0.01U [M]
C614	RCE1AKA470BG	10V 47U [M]
C615	ECEA1EKA101B	25V 100U [M]
C616	ECA1HM470B	50V 47U [M]
C617⚠	ECA1HM470B	50V 47U [M]
C618⚠	ECA2AM470B	100V 47U [M]
C619	ECKR1H103ZF5	50V 0.01U [M]
C620	RCE1VKA100BG	35V 10U [M]
C623	RCE1AKA101BG	10V 100U [M]
C624	ECEA1VKA470B	35V 47U [M]
C631-636	ECBT1H101KB5	50V 100P [M]
C651, 652	ECBT1H104ZF5	50V 0.1U [M]
C655	ECQV1H224JM3	50V 0.22U [M]
C656	ECQV1H474JM3	50V 0.47U [M]
C901-904	ECBT1H471KB5	50V 470P [M]
C905, 906	ECBT1H102KB5	50V 1000P [M]

Ref. No.	Part No.	Values & Remarks
C907	ECBT1H104ZF5	50V 0.1U [M]
C908	ECBT1E103ZF	25V 0.01U [M]
C909	ECEA1HKA2R2B	50V 2.2U [M]
C910	RCE1CKA100BG	16V 10U [M]
C911	ECBT1H270JU5	50V 27P [M]
C912	ECBT1H220GC5	50V 22P [M]
C913	ECEA1VKA470B	35V 47U [M]
C915	ECBT1E103ZF	25V 0.01U [M]
C916, 917	ECEA1HKA010B	50V 1U [M]
C918	ECBT1C105ZF5	16V 1U [M]
C919	RCE0JU102BV	6.3V 1000U [M]
C920	ECBT1E103ZF	25V 0.01U [M]
C922	ECEA0JKA221B	6.3V 220U [M]
C923	ECBT1H101KB5	50V 100P [M]
C924	ECBT1H102KB5	50V 1000P [M]
C954-957	ECBT1H101KB5	50V 100P [M]

■ Replacement Prats List (Cabinet)

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET PARTS	
1	RHD30073-K	SCREW	[M]
2	RKM0327-S	CABINET	[M]
3	XTB3+8JFZ	SCREW	[M]
4	REZ0883	FFC(14P)	[M]
5	REZ0944	FFC(21P)	[M]
6	XTBS3+8JFZ1	SCREW	[M]
7	RGK0817-M	SIDE PANEL(L)·1	[M]
8	RKA0076-N	FOOT	[M]
9	RGK0818-M	SIDE PANEL(R)·1	[M]
10	RMN0195	STOPPER	[M]
11	RMN0381	FL HOLDER	[M]
12	RFKGTHD50EN	FRONT PANEL ASS'Y	[M]
13	RGK0819-N	SIDE PANEL(L)·2	[M]
14	RGK0820-N	SIDE PANEL(R)·2	[M]
15	XTB3+12JFZ	SCREW	[M]
16	RGU1394-S	BUTTON, OPERATION	[M]
17	XTBS26+8J	SCREW	[M]
18	SHE170-2	PCB SUPPORT	[M]
19	RMK0324-1	CHASSIS	[M]
20	RMN0203	HOLDER	[M]
21	RGR0242B-E	REAR PANEL	[M]

■ Cabinet Parts Location



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